

\$2.50 / FEBRUARY 1988

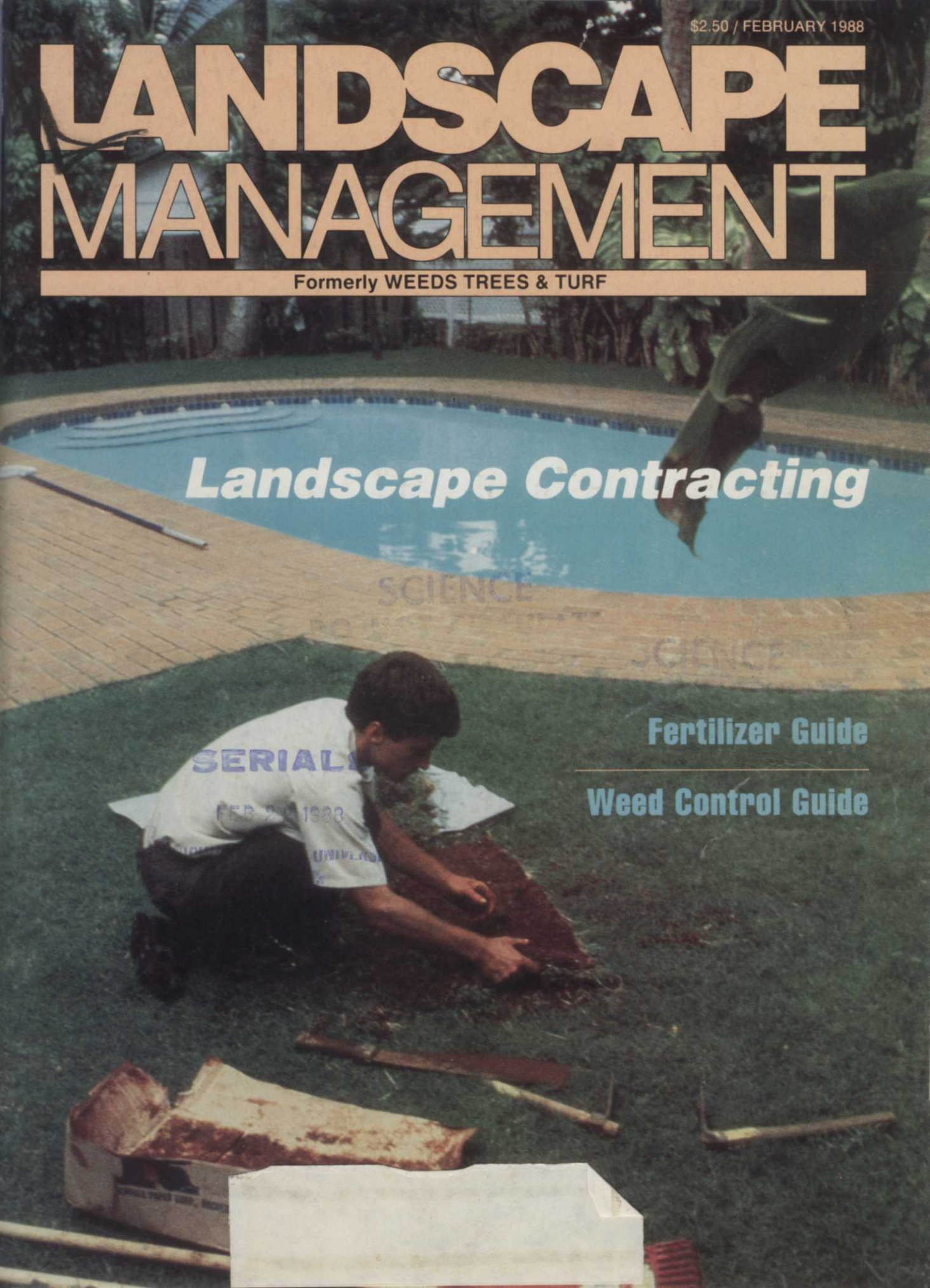
LANDSCAPE MANAGEMENT

Formerly WEEDS TREES & TURF

Landscape Contracting

Fertilizer Guide

Weed Control Guide



A Perfect Plug for PennLinks



DJ Pakkala, Supt.
The Vintage Club
Indian Wells, CA

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A handwritten signature in black ink, reading "DJ Pakkala".

PennLinks PVP 8700030



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TORO

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that keep you cutting.

LANDSCAPE MANAGEMENT

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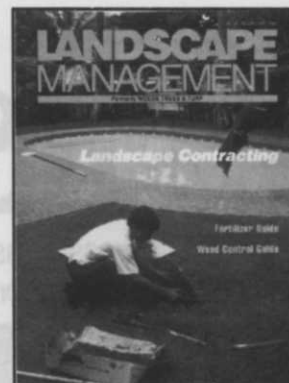
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Mulkern
Landscaping Co.
doing it Hawaiian
Style.

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More students on the horizon

■ Jules Janick, Ph.D., predicts that current low horticultural enrollments at universities will swing around in less than a decade.

Janick, outgoing president of the American Society of Horticultural Science, notes that figures also show that consumers are willing to pay more for landscape horticulture, and predicts that trend will continue.

"I'm optimistic but cautious," Janick told the A.S.H.S. membership at its annual meeting. "The success of Floridians to create a horticultural paradise over sand and alligators has been an inspiration to all of us. Whatever the future brings, I guarantee excitement."

A one-handed killer

■ Latest concern of the National Arborist Association is the one-handed use of small chain saws while pruning or trimming trees. "If ever there was the opportunity for a serious injury, this is it," says N.A.A. executive secretary Bob Felix.

"Accidents don't happen, they are caused," Felix told attendees at the ALCA/PGMS Green Team show. "No matter what you are doing, you can have unsafe situations. For moral and practical reasons, every employer has an obligation to make every employee work safer. You can't use safety training programs enough."

Felix also revealed that the American National Standards Association has written new standards and safety practices, which will be released soon, and that employers should make every effort to follow them.

Possible new bio-control

■ A newly-discovered parasite might be used to control grub populations in the future, leading to less pesticide use on turf and crops.

According to a report from the Connecticut Experiment Station Newsletter provided by LM advisor Marty Petrovic, the parasite's name is *Ovavesicula popilliae*. A spore is secreted by *O. popilliae* that is harmful to Japanese beetle grubs.

"Since it apparently attacks only Japanese beetles, it may have arrived here with the beetles about 1910," said the newsletter. "We are now determining if we can use it to help control Japanese beetles, and thereby reduce the amount of pesticide applied to the soil."

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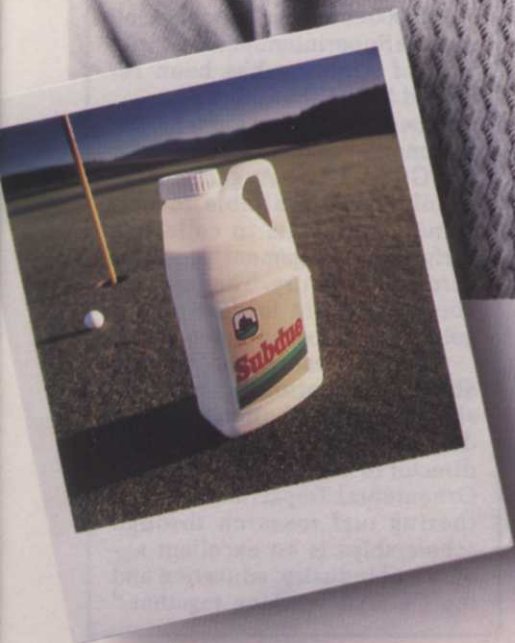
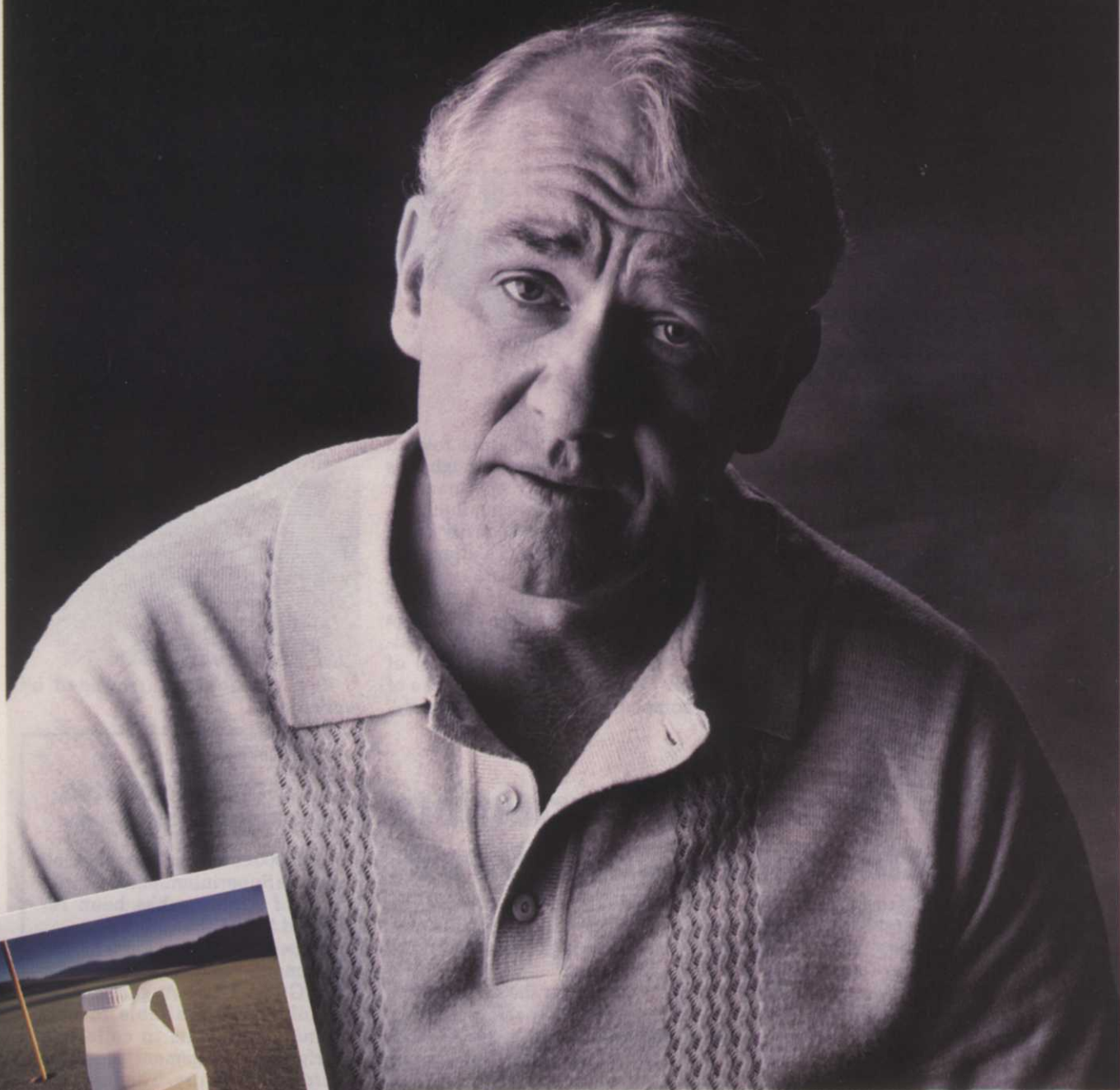
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INSECTS

Two new products for fire ant infestations

Two new products for control of the dangerous fire ant hit the market last summer, Logic fire ant bait from PBI/Gordon and Affirm fire ant bait from Merck.

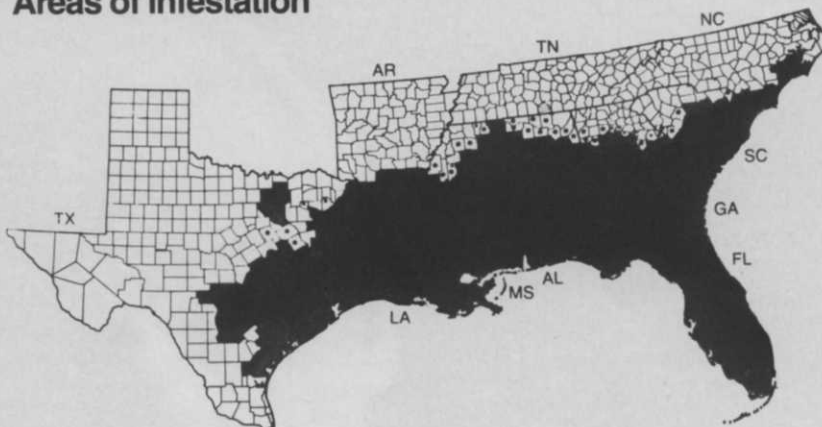
Fire ants, named for the burning sensation of their stings, are a growing problem across the southern part of the United States. They are potentially fatal to about one percent of the population. Invaders from Brazil, fire ants have spread over 270 million acres since their first appearance 50 years ago in Mobile, Ala.

Logic's active ingredient is fenoxycarb, an insect growth regulator. Test results show that newly-hatched winged female fire ants are completely sterile because of the effects of Logic, a granular bait. These young queens are the ants that could potentially mate and start new colonies. Logic also stops the development of the fire ant brood, preventing young larvae from becoming adult worker ants.

Logic is available to landscape managers through PBI/Gordon, Kansas City, Mo. (phone 816-421-4070).

Affirm is a bait derived from a natural soil microorganism. When worker ants feed it to fire ant queens, Affirm stops them from laying eggs. It is also toxic to the workers. Active

Imported Fire Ant Areas of Infestation



ingredient is abamectin.

Affirm is marketed more toward the homeowner market, though it is available to the landscape manager through the Rigo Company, Buckner, Ky. (502-222-1456) and Security Lawn & Garden Products, Ft. Valley, Ga. (912-825-5511).

"The product received kind of a late start last year," says George Gosen, director of agricultural products for MSD Agvet, a division of Merck. "We expect a lot more use of the compound in 1988 and beyond."



Fire ant queen surrounded by workers.

INSECTS

Insects become opportunists when attacking plants, trees

Weak, improperly-cared-for trees and other plants are the most likely targets of insect infestations, says Dave Nielsen, Ph.D. at Ohio State University's Agricultural Research and Development Center in Wooster.



Nielsen

Nielsen told landscape managers at the Pro Show in Dallas that getting rid of these pests could be a problem, but not just because of resilient bugs.

He cited concerns about liabilities associated with using pesticides in landscape management, the availability and cost of liability insurance, and government restrictions on chemical use in the marketplace.

Much of this can be avoided, he says, by properly caring for the tree from the beginning, "contributing to natural resistance."

Important among the contributors are site quality, superior planting stock and systemic tree health care. "Work with architects for proper planting sites," he suggests.

To match a tree to a site, he makes these considerations: exposure, drainage, traffic, fruiting, form, space and soil type.

Adequate supplies of clean air, moisture and sunlight above ground, and water, oxygen and nutrients below ground are essential. He suggests aerifying to a depth of 16 to 18 inches to keep a sufficient oxygen supply near the roots.

"The most important part of tree health care is the client," he adds.

ASSOCIATIONS

Ciba-Geigy donates \$50,000 to GCSAA

A \$50,000 contribution to the Golf Course Superintendents Association of America has been received from Ciba-Geigy.

The Robert Trent Jones Sr. Endowment Fund, established by the GCSAA last August, makes scholarships available to outstanding students in collegiate turfgrass management programs across the country. The fund encourages future leaders among golf course superintendents.

"We're pleased and excited about the opportunity to make a significant contribution to the endowment fund," says Bill Liles, director of Ciba-Geigy's Turf and Ornamental Department. "Furthering turf research through scholarships is an excellent example of industry, education and the GCSAA working together."

SHORT CUTS

Work closely with the client to gain an understanding of the tree's needs. He also believes in charging for a tree survey or inventory (this is a business, after all).

Trees and their caretakers have to deal with a myriad of insects. Nielsen says a healthy plant will go a long way toward reducing the need for major tree repair and pesticide applications: quality plants, not pest control.

ATHLETIC TURF

Artificial turf injuries appear to be on the rise

Artificial turf is hurting athletes, say an overwhelming number of college athletic directors. The athletic directors, from schools in the National Collegiate Athletic Association (NCAA), cited increased injuries to knees, ankles and elbows as the main reason they preferred natural fields.

Of the 177 who responded, almost 68 percent opposed synthetic surfaces. That included some Division 1A schools which currently have artificial fields. Only 23 percent support artificial turf, while the others are undecided.

BASF Corporation Fibers Division sponsored the survey. Respondents averaged more than 21 years experience in coaching and athletic administration.

More than half of the respondents, 53.1 percent, see a trend back to natural fields.

Comments from respondents characterized artificial surfaces as "too hard," "abrasive," with no give. Besides knee, ankle and elbow injuries, burns and contusions also topped the list.

An athletic director at a Division 1AA school in Illinois agrees "totally with our players and coaches that the injury situation is considerably worse when we play on artificial turf. If the players and coaches have their way, we will soon have all natural fields again."

Several coaches, however, favored synthetic turf. One service academy official said, "The main problem is footwear, not the turf." A Division III administrator said, "Our players learned to fall and run appropriately on the artificial surface."

Despite the controversy, some schools take a pragmatic approach to the matter. "Our coaches want to practice on natural grass," one administrator reported, "but play games on artificial."

For more information on athletic field safety and care, reprints of "Sidelined" and "Hard Knocks" from
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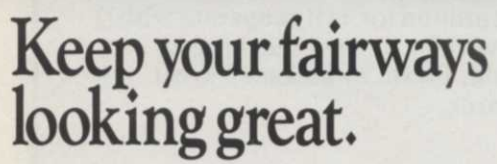
WELL-READ... Maria Cinque, horticultural extension agent for Long Island, N.Y., is becoming somewhat famous along the eastern seaboard. Cinque, since last April, has been writing a weekly column in the Sunday editions of *Newsday*. She also writes for the New York editions of the same newspaper. The papers have a combined circulation of more than one million readers. "These columns give the general public a constant in horticultural information," Cinque says.

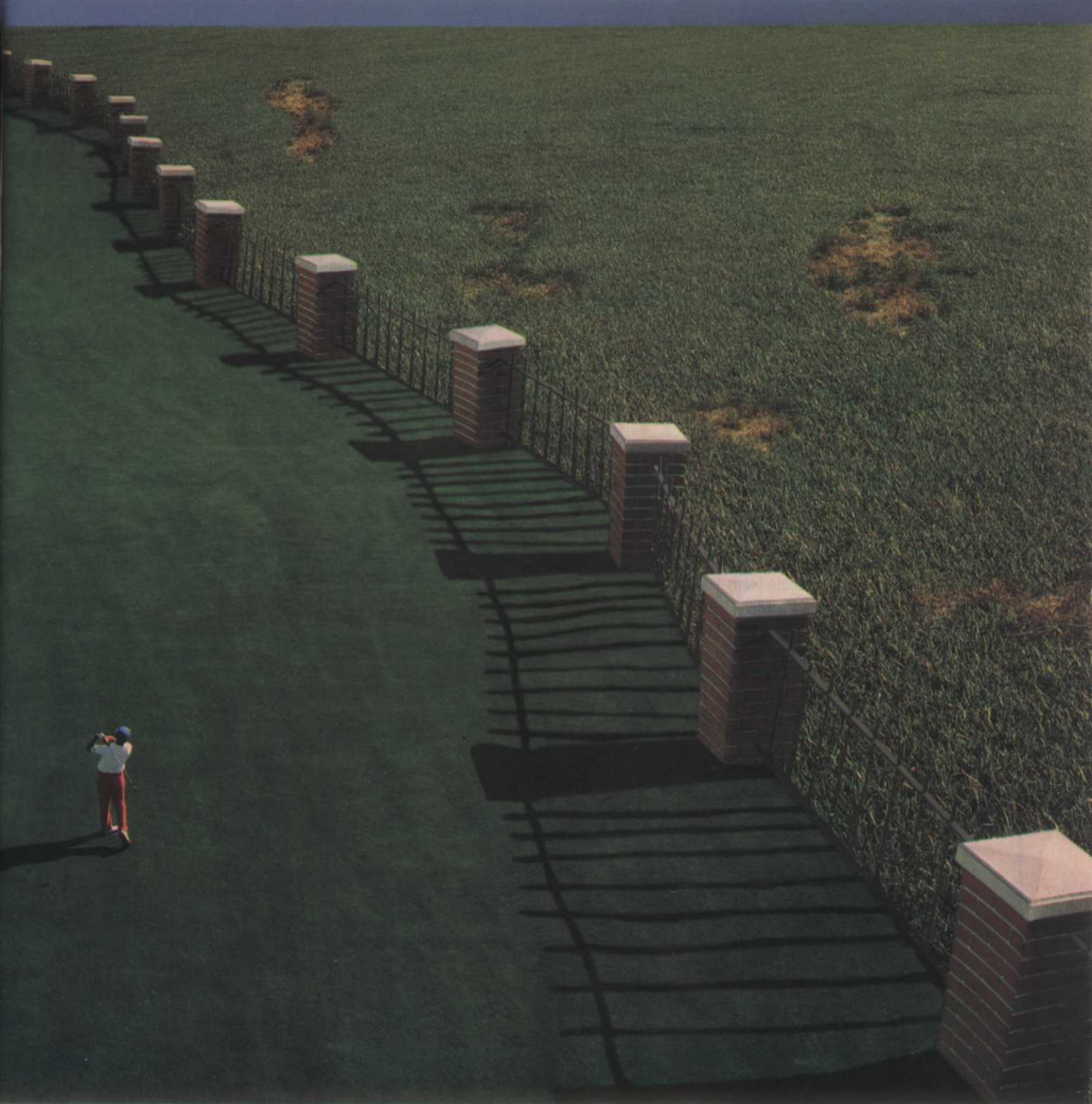
IMPRESSIVE PRESS... Robert Dedman of the Club Corp. of America recently received national attention, along with William Kubley of Landscapes Unlimited. Dedman, who founded Club Corp., was written up in the Dec. 14th issue of *Forbes* magazine. "Even before it turns profitable, a Dedman club can be a cash machine," *Forbes* said. Kubly, owner of Landscapes Unlimited of Lincoln, Neb., received a write-up in *Inc.* magazine for being the 441st fastest-growing entrepreneur in the country. Minors Lawn Care of Fort Worth, Tex. was No. 446 and Suburban Landscape of Davenport, Ia. was No. 447 on *Inc.*'s list of the top 500.

A WORLD RECORD... Briggs & Stratton, the world's leading manufacturer of small gasoline engines, has made the Guinness Book of World Records. The first product ever produced by the company from 1920 to 1923, a buckboard-like car called the Flyer, was named the most inexpensive mass-produced road car in history. The nationally-syndicated television show "Guinness Book of World Records," which was scheduled to air in mid-January, was to highlight the car. The Flyer sold for \$145 to \$225, according to George Thompson III of Briggs & Stratton. Only about 2,000 of the Flyers were manufactured, though.

RESTLESS NATIVES... ANVIL (Association for the use of Native Vegetation in Landscapes) received time on the Voice of America. Roger Lemke of LaFayette Home Nursery near Chicago invited a reporter to see the prairie growing in his yard. "I had to be careful," Lemke says. "I had to make sure I referred to aggressive weeds instead of Eurasian weeds."

GETTING INTO CONDITION... Seed companies no longer clean turfseed. But that doesn't mean you'll see a lot of weeds in the next lawn you seed. To get around (or, is it cooperate with?) the EPA, seed companies now refer to seed cleaning as conditioning. But, says Jerry Pepin, Ph.D., of Pickseed West, the seed still meets quality standards.





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NEWS from page 9

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PESTICIDES

Australian brings U.S. a new word

Peter R. Meadows, in an address to the National Pest Control Association, coined a new word. The word? "Toxo-terrorist."

The word, Meadows says, is derived from book "Toxic Terror" by Dr. Elizabeth Whelan. Whelan was a keynoter at the 1986 Professional Lawn Care Association's conference.

Meadows is group technical sales manager for W.A. Flick & Co. and vice-president of the Council of Australian Pest Control Association.

"We have decided (in Australia) that it is time that we attacked," Meadows said. "As long as we allow the public to judge us on the strength of debate between 'environmentalists' and 'pest exterminators,' we have lost every debate before we start."

"But if we change the debate to one between 'toxoterrorists' and 'environmental managers,' what a different picture that can create in the minds of listeners!"

Meadows said that the toxic terrorists do not know how to defend themselves.

"Senior government officers, who in the past have been very careful in what they say about these people, are now finding that 'toxoterrorism' has a nice way of rolling off their tongues and they are using it with increasing frequency."

Meadows concluded by issuing a challenge to his fellow pesticide applicators in America:

"Ladies and gentlemen, we bring you this word to add to your language. We dare you to use it. Leave the black magic to the toxo-terrorists. They will, with our help, eventually become entangled in their own web of deceit."

BUSINESS

Foiling lawsuits with a few tricks

Landscape, lawn care and tree companies should incorporate every truck individually, says attorney Richard Jack of Athens, Ga. Jack says that such a tactic will protect the company from paralyzing lawsuits.

"Most large cab companies incorporate cabs individually," Jack says. That way, Jack explains, a person can sue for only the worth of the truck that committed the wrong, not the entire corporation. "If you have a major liability source, cut it away from your corporation," Jack says. "Take your assets out of the corporation. Never travel under your own hat. Always travel under the corporation's hat."

In order to meet all the rules of a corporation, Jack says you must remember to file an annual report and have a meeting with the board of directors. "That means you have to meet with yourself," he says.

Another way to guard against lawsuits is to not modify equipment on your own. "If you go out and build equipment, you're the manufacturer," Jack warns. "If you're a dealer, get the manufacturer to do it."

Also, make sure equipment isn't worn. "Worn equipment will get you into trouble because you know better," Jack says. "Even by attending trade shows, you're held to a higher standard."

Jack spoke at the Pro Show in Dallas, Texas.

continued on page 16



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Scotts patented TGR technology weakens Poa annua on fairways and bentgrass greens, while controlled-release fertilizer helps desirable turf thrive and overtake the Poa.

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What A Scotts Tech Rep Considers An Eyesore On The Golf Course.

sudden change in playing surface conditions.

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For more information contact your Scotts Tech Rep or simply call 1-800-543-0006. In Ohio call collect 513-644-2900.

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SEED

1988-89 seed crop looks on bleak side

The extended drought in the Pacific Northwest last fall may have damaged the seed crop. "The groundwork for 1988 has already been laid and it doesn't look very good," says Jerry Pepin, Ph.D., of Pickseed West.

The Kentucky bluegrass crop, however, will be slightly improved, according to Pepin. "A year ago crops were terrible. This year they will be tight," he says. "The crop should be healthy, but the demand is unprecedented. Prices will be high, and better varieties will be limited."

The bentgrass crop may be slightly improved, but demand will keep prices high. "There's a lot more use on fairways in the North," Pepin says. "And it's being used for overseeding in the South."

Pepin estimates fine fescue supplies to be adequate, despite a decrease in growing acres. "For low-maintenance or shade tolerance, fine fescues can't be beat," he says. "Prices will be firm."

Supplies of perennial ryegrass and turf-type tall fescue will be short. "Use of perennial ryegrass is higher

than it's ever been," Pepin says. Despite the fact that seed companies produce more than 50 million pounds annually, increased use on fairways and home lawns will keep supply low and prices high.

Tall fescues are in demand because of their drought tolerance. "The dwarf-type varieties will be the wave of the future," Pepin says.

Pepin recommended buying seed early in the spring, especially if you want a specific variety. He spoke at the North Central Turfgrass Conference in St. Charles, Ill.

PEOPLE

Ohio State's Buscher retires to Wooster

Fred K. Buscher has retired from The Ohio State University's horticulture department, effective last summer.

Buscher, Ph.D., retired as Professor of Horticulture Emeritus. As a district specialist in landscape horticulture, he had developed and conducted a series of five landscape design short courses, the Northeast Ohio Horticultural Trade Shows and the Nursery Field Days. Buscher will remain active in the nursery industry and reside in Wooster, Ohio.

Thomas W. Hofer has been named president of Spring-Green Lawn Care, Plainfield, Ill. Hofer's appointment was made by William Fischer, who died Jan. 7 of pancreatic cancer at the age of 41. The appointment is a rare accomplishment in the franchise industry: he has risen to the top spot in the company after having been one of Spring-Green's first franchisees from 1977 to 1980.



Hofer

INDUSTRY

Landscape Management an Edgell magazine

Ownership of LANDSCAPE MANAGEMENT and 109 other titles changed hands Jan. 1, 1988. LM, formerly an HBJ publication, is now owned by Edgell Communications Inc. of Cleveland, Ohio.

An investor group led by Robert L. Edgell purchased HBJ Publications and HBJ Beckley Cardy for \$334 million. Edgell, 65, headed HBJ Publications for nearly 20 years.

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Heyser Landscaping
Norristown, PA

Hillenmeyer Nurseries
Lexington, KY

Brickman Group, Ltd.
Jenkintown, PA

Doerler Landscapes
Lawrenceville, NJ

The Bruce Company
Middleton, WI

Environmental Industries
Calabasas, CA

Cagwin & Dorward
Novato, CA

J. Farmer & Co.
Middleton, MA

Carlacio Industries
Fullerton, CA

Gibbs Landscape Co.
Atlanta, GA

Chapel Valley Landscape
Woodbine, MD

Greathouse Landscaping Co.
Nashville, TN

City Gracens, Inc.
Newton, MA

Greenleaves
Chamblee, GA

AAA Lawn Industries
Tucker, GA

Clark-Morrell
Lithonia, GA

Ground Control Landscape, Inc.
Orlando, FL

American Landscape, Inc.
Canoga Park, CA

Clarence Davids & Sons
Blue Island, IL

Hawkins Nursery & Landscape
Dallas, TX

Davis Landscaping Contractors
Harrisburg, PA

Edmund M. Hayden Inc.
Woodstock, IL

D.A. Hoerr & Sons
Peoria, Ill.

DeLaurentis Construction Co.
Mamaroneck, NY

Ireland-Gannon Assoc.
Long Island, NY

Designs by Lee
Stamford, CT

TOP
50
LAND
CONTRACTORS

This alphabetical listing in no way

GREEN AND GROWING

The third annual LANDSCAPE MANAGEMENT survey of the Top 50 money-making landscape contractors in the United States is growing along with the landscape industry.

By Jeff Sobul, assistant editor

As the landscape industry grew in volume in 1987, so, too, has LANDSCAPE MANAGEMENT's list of the Top 50 money-makers for that year.

The 50th largest company on the 1988 list, which reflects 1987 revenues, had earnings of \$3.5 million, compared with earnings of \$2.2 for last year's No. 50 company.

Not surprisingly, Environmental Industries, Calabasas, Calif., was again the top earner, with sales of \$114 million spread over its 29 branches and subsidiaries.

The Brickman Group, Jenkintown, Pa., returned to the Top 50 this year after declining to participate in the 1987 listing. The company's earnings of \$35 million put it in second place on

the 1988 list.

Nine of the top 10 companies earned at least \$10 million. The remaining seven, in order, are Moulder Brothers, Glendale, Calif. (\$20M); DeLaurentis Construction, Mamaroneck, N.Y. (\$18M); Carlacio Industries, Fullerton, Calif. (\$15M); Vidosh Brothers, Sterling Hts., Mich. (\$14.2M); Lancaster Landscapes,

Johnson Hydro Seeding Corp.
Rockville, MD

KT Enterprises
Alexandria, VA

Landscape Contractors of Illinois
Bartlett, IL

Landscape Design & Construction
Dallas, TX

Larchwood Construction Corp.
Holtsville, NY

Las Colinas Landscape Services
Irving, TX

Lied's Nursery Co.
Sussex, WI

Meadowbrook
Savannah, GA

Moulder Brothers
Glendale, CA

North Haven Gardens
Dallas, TX

Northwest Landscape Industries
Tigard, OR

Oak Brook Landscaping
Oak Brook, IL

Oyler Bros. Co.
Orlando, FL

Reinhold Landscape
Flat Rock, MI

Ruppert Landscaping
Ashton, MD

SaBell's Inc.
Englewood, CO

Scapes
Marietta, GA

Alfred L. Simpson & Co.
Atlanta, GA

Southern Tree & Landscape
Charlotte, NC

Torre & Bruglio
Landscape Contracting
Mount Clemens, MI

Valley Landscaping
Lodi, CA

Vidosh Brothers
Sterling Hts., MI

Yardmaster
Painesville, OH

Lambert Landscaping
Dallas, TX

Lancaster Landscapes, Inc.
Arlington, VA

THE NORTH AMERICAN LANDSCAPE CONTRACTORS

effects rank by size or quality.

Arlington, Va. (\$13.8M); Davis Landscape Contractors, Harrisburg, Pa. (\$12M); and The Bruce Company of Wisconsin, Middleton, Wis. (\$10.7M). The No. 10 company is Oyler Brothers, Orlando, Fla. (\$9M).

The following is a list and brief description of those companies giving permission to LANDSCAPE MANAGEMENT to use the information (branch offices are in addition to a main office):

AAA Lawn Industries, Tucker, Ga., had 150 maintenance contracts and performed 20 design/build jobs for revenues of \$4.5 million in 1987. The company employs 110 peak and 50 year-round workers and maintains three branch offices.

American Landscape, Inc., Canoga Park, Calif., had revenues of \$8.4 million on 130 maintenance contracts and 75 design/build jobs in 1987. With one branch office, the company has 175 peak and 150 year-round employees.

The Brickman Group, Ltd., Jenkintown, Pa., operates three branches and employs

800 peak and 300 year-round workers. The company had sales of \$35 million for 1987. Figures were unavailable for the number of design/build jobs and maintenance contracts.

The Bruce Company, Middleton, Wis., grossed \$10.7 million on 200 design/build jobs and 45 maintenance contracts. With one branch office, the company employs 200 peak-season and 45 year-round workers.

Cagwin & Dorward, Novato, Calif., had sales of \$8.5 million on 120 design/build jobs, of which 90 were erosion control, and 250 maintenance contracts. The company employs 180 peak and 150 year-round workers and operates five branch offices.

Carlacio Landscape, Inc., Fullerton, Calif., grossed \$15 million on 20 design/build jobs and 15 maintenance contracts. From three branch offices the company sends 275 peak and 200 year-round employees.

Chapel Valley Landscape Co., Woodbine, Md., grossed \$8 million on 40 design/build jobs and 75 maintenance contracts. The company has 125 peak and 85 year-

round employees in four branch offices.

City Gardens, Inc., Newton, Mass., grossed \$5.3 million in 1987 on 200 design/build jobs and 1700 interior maintenance contracts. With its one branch office it employs 140 people year-round.

Clark-Morrell, Inc., Lithonia, Ga., grossed \$6.4 million on 115 maintenance contracts and 50 design/build jobs. The company has 130 peak and 110 year-round employees.

Clarence Davids & Sons, Blue Island, Ill., grossed \$3.75 million on 120 maintenance contracts. It has one branch office and employs 125 peak and 30 year-round people.

Davis Landscape Contractors, Inc., Harrisburg, Pa., grossed \$12 million on 50 each of design/build jobs and maintenance contracts. With four branch offices, it has 225 peak and 150 year-round employees.

DeLaurentis Construction Co., Mamaroneck, N.Y., had sales of \$18 million on about 25 design/build jobs, the biggest chunk being commercial. The company employs 160 to 170 peak and 50 year-round

THE BEST OF THE REST

The following is a list of companies with revenues between \$2 million and \$3.2 million which returned surveys:

Amlings Landscape Co. Hinsdale, IL	Industrial Landscape Services San Jose, CA
Arbor Heights Nursery Webster, NY	JBK Landscape Aurora, CO
Bland Brothers, Inc. West Jordan, UT	Kujawa Enterprises Cudahy, WI
Boyco Landscape Wilson, NC	L&L Landscape Services Santa Clara, CA
Bregenzer's Alpharetta, GA	Land Design Group Dallas, TX
Robert W. Childs Landscape Contractors Arnold, MD	Lifescapes, Inc. Canton, GA
Contra Costa Landscaping Martinez, CA	McDugald-Steel Houston, TX
Control Environmental Secaucus, NJ	Richway Landscaping Kingwood, TX
Garden Gate Landscaping Silver Springs	Rood Landscaping Jupiter, Fla.
Greater Detroit Landscaping Warren, MI	Suburban Landscape Assoc. Davenport, IA
Green Carpet Landscape Worcester, MA	Varsity Sodding Service Swoyersville, PA
The Greenery Hilton Head, SC	Veldkamps Inc. Denver, CO
Greeno, Inc. Concord, MA	Virginia Turf Management Associates Norfolk, VA
The Ground Crew Arlington, TX	White Oak Landscaping Kennesaw, GA

workers.

Designs by Lee, Stamford, Conn., used 25 commercial and 200 residential design/build jobs plus 42 maintenance contracts to gross \$5.4 million. The company employs 130 peak and 30 year-round people.

Doerler Landscapes, Inc., Lawrenceville, N.J., grossed \$4.1 million on 170 design/build jobs and 85 maintenance contracts. With two branch offices, it employs 100 peak and 40 year-round employees.

Environmental Industries, Calabasas, Calif., is the largest landscape contractor in the U.S. with sales of \$114 million for 1987. The company operates three divisions with 29 branches or subsidiaries in five states. The company employs about 2,200 workers at peak and 2,000 year-round. Figures for design/build jobs and maintenance contracts were unavailable.

J. Farmer & Co., Middleton, Mass., had sales of \$4 million on 70 design/build jobs in 1987. The company employs 55 peak and 15 year-round workers.

Gibbs Landscape Co., Atlanta, Ga., has sales of more than \$6 million from its main office. The company employs 100 to 160 people to complete 1,700 design/build jobs and 600 maintenance contracts.

Greathouse Landscape Co., Nashville, Tenn., had sales of \$3.5 million on 102 design/build jobs and 114 maintenance contracts. It operates with 85 peak and 55 year-round employees.

Greenleaves, Chamblee, Ga., grossed \$7.25 million on 102 maintenance contracts and 96 design/build jobs. It has 160 peak and 90 year-round employees in two branch offices.

Ground Control Landscaping, Orlando, Fla., grossed \$4.3 million on 78 maintenance contracts and 23 design/build jobs. With one branch office it employs 115 peak and 100 year-round employees.

The Ground Crew, Arlington, Tex., grossed \$2.85 million on 210 maintenance contracts and 15 design/build contracts. Its 87 peak and 30 year-round employees work from two branch offices.

Edmund M. Hayden, Inc., Woodstock, Ill., had revenues of \$5.5 million in 1987. The company's 75 peak and 20 year-round employees performed 30 construction jobs and had 15 to 18 maintenance contracts.

Heyser Landscaping, Norristown, Pa., had revenues of \$6 million in 1987. Totals for design/build jobs and maintenance contracts were unavailable at press time. The company employs 165 peak and 65

year-round employees and operates one branch office.

Hillenmeyer Nurseries, Lexington, Ky., has 135 peak and 100 year-round employees who also operate three garden centers. In 1987, the company finished over 400 design/build jobs and had 35 maintenance contracts for revenues of \$3.5 million.

D.A. Hoerr & Sons, Peoria, Ill., reached \$5 million in sales on 300 design/build jobs and three maintenance contracts. The company has four branch offices and employs 125 peak and 75 to 80 year-round employees.

Johnson Hydro Seeding, Rockville, Md., grossed \$5.4 million on 35 design/build jobs, mostly seed establishment. The company has five branch offices and employs 85 peak and 25 year-round employees.

KT Enterprises, Alexandria, Va., operates one branch office and employs 325 peak and 150 year-round workers. The company had sales of \$8.3 million on 70 maintenance contracts serving 400 properties. Figures for design/build jobs were unavailable.

Lancaster Landscapes, Arlington, Va., had sales of \$13.8 million on 350 maintenance contracts and five design/build

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jobs. The company operates eight branch offices with 500 peak employees and 300 year-round.

Landscape Contractors of Illinois, Bartlett, Ill., completed 150 design/build jobs and had 36 maintenance contracts en route to \$8 million in sales. They were performed by 140 peak and 30 year-round employees.

Landscape Design & Construction, Dallas, Texas, had revenues of \$8.2 million on 55 to 60 design/build jobs and 285 maintenance contracts. The company operates three branches and has 260 peak and

210 year-round employees.

Larchwood Construction Corp., Holtsville, N.Y., grossed \$4 million on 20 to 30 design/build jobs and 17 maintenance contracts. The company has one branch office and 55 employees.

Las Colinas Landscape Services, Irving, Texas, used 200 maintenance contracts and 34 design/build jobs to gross \$6.5 million. It employs 250 peak and 175 year-round workers.

Lied's Landscape Design & Development, Sussex, Wis., grossed \$4 million on 1,500 design/build jobs and 300 maintenance

contracts. With one branch office it employs 210 peak and 100 year-round people.

Meadowbrook, Savannah, Ga., had revenues of just over \$4 million in 1987 on more than 100 design/build jobs and 30 maintenance contracts. The company has 40 year-round employees and peaks out at over 100.

Moulder Bros., Glendale, Calif., grossed \$20 million on 25 to 30 design/build jobs. The company employs 100 peak and 30 year-round workers.

North Haven Gardens, Dallas, Texas, reports \$3.6 million in sales on 800 to 1,000 design/build jobs and 75 maintenance contracts. The company has one branch office and employs 125 peak and 100 year-round people.

Oak Brook Landscape & Maintenance, Oak Brook, Ill., had 80 maintenance contracts and 42 design/build jobs for \$3.7 million in sales in 1987. It has 90 peak and 20 year-round employees operating two branch offices.

Oyler Bros., Orlando, Fla., had 300 maintenance contracts and 65 design/build jobs for \$9 million in sales. It has three branch offices with 300 peak and 225 year-round employees.

Ruppert Landscape Co., Ashton, Md., had \$6.1 million in sales on 140 design/build jobs and 75 maintenance contracts. The company has 125 peak and 75 year-round employees with one branch office.

SaBell's, Inc., Englewood, Colo., had gross revenues of \$8.5 million on 125 design/build jobs and 50 maintenance contracts in 1987. The company operates one branch office and employs 300 peak and 50 year-round workers.

Scapes, Marietta, Ga., grossed \$4.5 million on about 50 design/build jobs and 25 maintenance contracts in 1987. The company has 150 peak and 60 year-round employees operating one branch office.

Alfred L. Simpson & Co., Atlanta, Ga., had 150 maintenance contracts and 30 design/build jobs for \$5.0 million in sales for 1987. The company employs 120 peak and 90 year-round workers.

Southern Tree & Landscape, Charlotte, N.C., grossed \$5.4 million on 225 design/build jobs and 65 maintenance contracts. The company has four branch offices with 160 peak and 120 year-round employees.

Torre & Bruglio Landscape Contractors, Mt. Clemens, Mich., had 225 design/build jobs and 135 maintenance contracts for sales of \$3.5 million. With one branch office, it employs 85 peak and 20 year-round workers.

Valley Landscaping, Lodi, Calif., had sales of just over \$4 million on 70 design/build jobs and 80 maintenance contracts in 1987. The company employs 150 peak and 100 year-round workers.

Vidosh Brothers, Sterling Hts., Mich., grossed just over \$14.2 million on 150 design/build jobs and 75 maintenance contracts in 1987. The company operates four branch offices and employs 250 peak and 100 year-round workers.

Yardmaster, Painesville, Ohio, which employs 60 to 120 workers, did \$4 million business in 1987 from 400 design/build jobs and 125 maintenance contracts. **LM**

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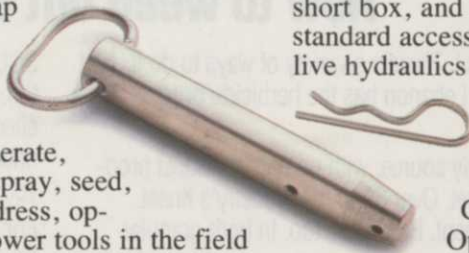
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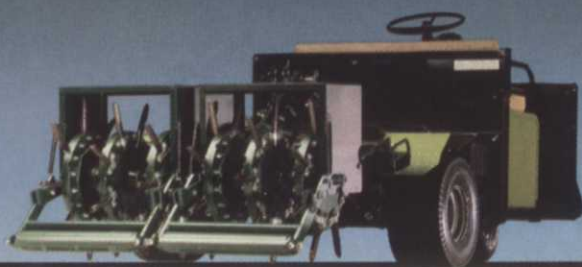
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Since turf areas are scarce in Honolulu, Mulkern believes renovation is the key to a healthy yard.

LANDSCAPING, ALOHA STYLE

Hawaii may be a tropical paradise. But landscaping on the islands is a competitive business, in which Mulkern Landscaping has carved a niche for its customers.

by Heide Aungst, managing editor

Most people know of Ferdinand and Imelda Marcos for one of two reasons: the hostility in the Phillipines or the thousands of shoes. Kevin Mulkern of Mulkern Landscaping in Honolulu, Hawaii knows the couple by its landscape. Or, would have, if things had gone as planned.

Mulkern's company installed the landscaping at the home the Marcos' planned to purchase in their flee to Hawaii. But neighbors didn't want the Marcos' to move in. Because of the

neighborhood pressure, the infamous couple bought a home elsewhere on the island.

Still, Mulkern and his co-owner and wife, Susan, landscape many of the homes of the rich and famous on the island of Oahu.

Their business is small, but successful, amidst the competitive atmosphere of the island. Susan estimates 1987 gross sales around \$300,000. The company has seen steady growth and success since its beginning in 1975.

Back then, Kevin worked alone,

when he wasn't too busy surfing, he confesses. The business started out by the North Shore, famous for its surfing. But after several years, and more than an hour commute to most accounts, he moved it into the city. "More of the money is on this side of the island," Mulkern explains. "And now I'm within 15 minutes of all my accounts."

Susan joined the business in 1978. Today, the company employs eight workers year-round, since there's never an "off-season" in Hawaii. They



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RANSOMES

WHERE GREAT IDEAS START

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Orchids can be planted in tree crevices to help create lush landscapes.

do a little bit of everything in the plant and landscape realm for the 40-plus homes under contract. Susan says the business expanded in 1987 from primarily installation/maintenance to about 50 percent design/build, 50 percent maintenance and installation. "We're finding that people are wanting a one-stop shop," she says. "It makes life a lot easier for them."

Much of the design/build includes nightscaping. Lighting is a popular

line to very acidic, such as volcanic ash."

Turf is a scarce commodity on the island. Those who can afford to own property have very little turf.

Bermudagrass and zoysiagrass are the common home lawn turfs, while St. Augustinegrass grows in low-

maintenance areas.

Sprigs from the mainland must be quarantined for up to two years, since turf carries the same viruses as sugar cane. Then, it's expensive to install, a flat (1.39 square feet) of zoysiagrass sells for \$6 to \$7; centipedegrass is \$4 to \$5; and Bermudagrass is about \$3.25 a flat.

Mulkern uses mostly walk-behind equipment because of the small area of most lawns and narrow gates leading to yards. The rotaries include Lawn Boy, Snapper and Sensation. Reel mowers, which he uses on hybrid Bermudagrass lawns, are Pro Master and Trimmer.

The best tool, he says, is his Ryan verticutter. "Verticutting pulls out stems, rhizomes and stolens," Mulkern explains. It's especially important in zoysia lawns which develop thatch quickly. The process includes thinning the lawn, then aerating. Next, the crew top dresses with a light coat of sand or soil, depending on the site. "For clay soils we use a heavier soil so you don't get that ice cream sandwich effect," Mulkern says. Within two weeks, at any time during the year, the lawn begins to fill in.

But Mulkern found out through one lawn renovation that it's important to have good communication with customers. One of Mulkern's clients is a wealthy real estate investor who's home overlooks the ocean and who's spotless garage holds Andy Warhol prints. The man decided to throw an important party just days

Turf is a scarce commodity on the island. Those who can afford to own property have very little turf.

landscape addition on the island, since people spend most of their time outside around their pools.

A different terrain

Working the Hawaiian landscape takes skill. "There's one inch of rainfall every block up to about two miles toward the mountains from Waikiki beach. It's dramatic going from desert to mountains," Mulkern says. "There are a lot of soil types, like sandy soils along the coastline. There's very alka-



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To get a competitive edge in the market, Mulkern's employees will go all-out to maintain ocean-front homes.

after Mulkern's crew had heavily renovated the lawn.

"We used dye...green dye," Mulkern reminisces. "He had tables set up on the lawn, and even received compliments on his lawn."

Almost all landscapes are irrigated in Hawaii. Mulkern recommends his clients use automatic Rain Bird systems. "I haven't had a lot of success giving homeowners irrigation sched-

ules," he says.

Since turf is scarce, much of the landscape maintenance is done on plant material, like flowering jacarobia, plumeria trees or the state flower, hibiscus. In fact, Mulkern designed his own version of the hibiscus for his company logo.

"Most people want a lush tropical look," Mulkern says. To add flowers to trees, Mulkern's crew will plant or-

chads in tree crevices. "Trees bloom throughout the year based on how much water you give them," he says. I don't really notice a difference in seasons."

Uniformity

Despite the naturalness of the Hawaiian "tropical look," competition on the island is intense. "In the old days, I used to tell people it's a great business to get into, but there's too many now," he says.

One thing some of his competitors don't do is to require uniforms. "We

Each employee has 11 sets of shirts and pants. Each week they turn in five sets to be cleaned by the uniform supplier.

do a lot of work inside people's houses and it's awkward not to have people easily identifiable," he explains. "It's also convenient for them to have uniforms."

Each employee has 11 sets of shirts and pants. Each week they turn in five sets to be cleaned by the uniform supplier. The supplier also does alterations. That way Mulkern guarantees his employees show up in clean uniforms.

Another competitive aspect to the job is getting the projects. "Bids on a project can vary 40 to 50 percent," Mulkern says. "The most frustrating part of dealing with customers is that they don't understand what you're selling or what they need. Our higher price reflects that they're getting personal service."

Hawaii businesses also face laws which don't govern other states and which run up the cost of doing business. For example, it's mandatory for employers to carry medical insurance for employees. Companies are able to deduct 50 percent of the cost. The Mulkerns provide 95 percent of the cost of insurance. Employees contribute \$5 monthly toward the medical plan.

Business insurance is getting better. "Three years ago it was 17 percent," Mulkern says. "Now it's down to eight percent."

But the benefits outweigh the price according to Susan and Kevin. They plan to expand to the nursery side of the landscape business in the future.

One thing's for sure. They won't leave the island. Even residents know when they're in paradise. **LM**

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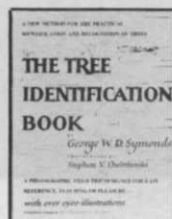
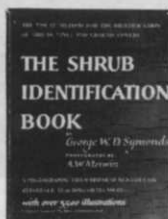
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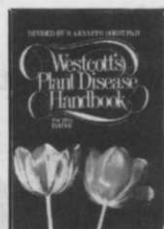
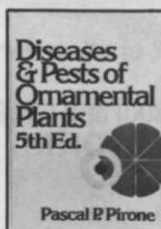
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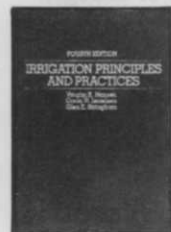
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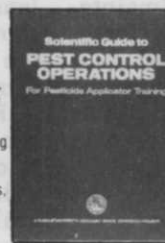
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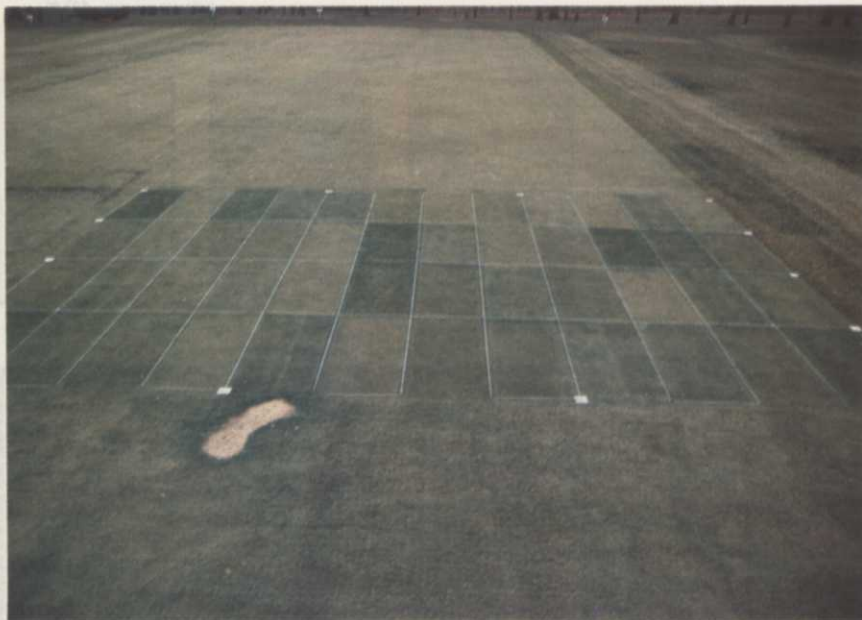
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NEW CONCEPTS IN TURF FERTILIZATION

Nitrogen is the most important element in a successful fertilization program. New concepts demonstrate when it is the best time to apply nitrogen, and how much is needed.

by John R. Street, Ph.D., Ohio State University



Late-season fertilization will extend the greening period and aesthetics of turf in fall and spring.

Turfgrass growth depends on an adequate supply of all essential plant nutrients, plus many other cultural and edaphic (soil-related) factors. Research in plant nutrition has shown that at least 16 elements are essential for plant growth and development (Table 1).

Those essential elements used in greatest quantities by the plant are referred to as macronutrients: nitrogen, phosphorus and potassium. Micronutrients, seldom deficient in most soils, are needed in relatively small quantities by the plant.

Nitrogen fertilization

Nitrogen receives the most attention

in turfgrass fertilization programs for several reasons.

First, nitrogen is the essential element to which turfgrass is most responsive (Table 2). A key concept in turfgrass fertilization is that nitrogen is the "growth-control element." Supplies of other elements are maintained at adequate levels (maintenance fertilization). The turfgrass manager regulates growth and color by adding or withholding nitrogen.

Second, nitrogen plays a major role in turfgrass heat, drought and cold stress tolerances by its effect on rooting, plant carbohydrate levels and plant hydration.

Third, the turfgrass plant con-

tains more nitrogen than any other element.

Fourth, nitrogen is a very dynamic element in the soil system. Its concentration is constantly changing, usually decreasing. The other essential elements are significantly more stable in soils. Nitrogen, therefore, must be routinely added to turfgrass to maintain a soil level sufficient for turfgrass growth.

An ideal nitrogen fertilization maintenance program on established turfgrass should provide for very slow to moderate uniform topgrowth throughout the growing season (Figure 1). The ideal program should supply enough nitrogen to stimulate some growth and green color to maintain turf quality and recuperative potential, where necessary. Rapid changes or surges in topgrowth, sometimes referred to as peak and valley growth or feeding, are undesirable from both an agronomic and maintenance standpoint.

Turfgrass shoot growth can be largely managed by the (1) amount of nitrogen applied; (2) type of nitrogen applied and (3) timing of the nitrogen application. Fast-release sources (e.g. urea) are readily available for the plant's use. They stimulate a relatively rapid plant/growth response.

Slow-release sources (e.g. methylene urea, sulfur-coated urea, IBDU) provide a time release of nitrogen to the plant. This results in a more uniform or controlled growth.

Fast-release/slow-release nitrogen combinations are typically used to control turfgrass growth and provide safety. Higher nitrogen rates generally stimulate greater turfgrass shoot growth.

continued on page 40

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Nitrogen rates are usually limited to 1/2 to 1 pound per 1,000 sq. ft., especially with fast-release nitrogen sources. This avoids undesirable shoot growth surges during periods favorable for shoot growth (i.e. spring on cool-season grasses).

Recent nitrogen fertilization philosophy has been to limit nitrogen levels. This helps to avoid excessive topgrowth and adhere to a slow-to-moderate shoot growth concept.

This philosophy stems in part from the impact that nitrogen has on rooting and plant carbohydrate levels. Carbohydrates (sugars) support growth of plant parts (e.g. shoots and roots) and assist in recovery from injury. Carbohydrates are also the key source or energy for maintaining all the plant's growth and physiological processes.

Nitrogen applications favor turfgrass growth. As nitrogen rates are increased, more topgrowth is usually produced. More topgrowth results in more carbohydrate use to support this growth. A key physiological principle is that under rapid growth, shoots take priority over roots, rhizomes and stolons for available carbohydrate. Shoot growth will continue to respond to higher nitrogen levels, distinctly suppressing root growth and other growth processes.

These effects are well illustrated in a fertilization study evaluating the response of a Merion Kentucky bluegrass sod to incremental rates of nitrogen (topgrowth) and nitrogen content of clippings.

In contrast, sod strength, a reflection of root and rhizome growth, and rhizome weight decreased at higher

Table 1:
Essential Plant Nutrients Required for Turfgrass Growth and Development

Macronutrients	Typical Percentage in Turfgrass Tissue ^a	Remarks
Nitrogen Phosphorus Potassium	3-6 0.2-0.5 2-3	Commonly used in maintenance fertilization at ratios of 3-1-2 to 5-1-2. Additional P and K (corrective) may be necessary where inherent soil levels are low.
Sulfur	0.2-0.3	Usually only applied where a specific deficiency has been diagnosed. Used in ratios similar to P.
Calcium Magnesium	0.4-0.6 0.2-0.4	Usually only applied where a soil pH adjustment is required or on alkali soils.
Micronutrients	Typical Parts per million (ppm) in Turfgrass Tissue	Remarks
Iron Zinc Molybdenum Manganese Copper Boron Chlorine	40-200 40-120 0.1-0.2 20-150 15-20 5-20 —	Iron is usually used to provide short term green color enhancement. Micronutrients primarily deficient on alkaline soils and/or soils with high phosphorus and/or high micronutrient levels (Mn, Zn, and Cu). Seldom deficient on fine-textured soils.

^a Elemental percentages will vary to some extent depending on turfgrass species and cultivars, environmental conditions and other variables.

nitrogen levels. Thus, when most of the plant's carbohydrate was directed toward shoot growth, root and rhizome growth suffered accordingly. Agronomists well recognize that a plant's stress tolerance is directly related to the depth and mass of the

plant's root system.

Research at Ohio State University has shown that root initiation and root growth of cool-season grasses occurs in the spring and again in the fall (Figure 2). Liberal nitrogen fertilization in the spring will have a tendency to restrict root growth in favor of shoot growth. The turfgrass plant will go into the summer with a shorter root system than when low-to-moderate rates of nitrogen fertilizer are used.

Furthermore, high rates of nitrogen will increase topgrowth and increase the need for spring mowing. Rapid topgrowth may result in the removal of large amounts of clippings at each mowing. The removal of more than a third of the foliage at any one mowing retards both root and tiller development.

A reduction in root growth at this time is extremely critical since spring is an optimum time for root growth. A lot of "good root growth growing time" can be lost in the spring by heavy nitrogen applications.

Thus, mismanagement of nitrogen during the spring can have a dramatic effect on the root system under the turfgrass going into the summer. This, in turn, means a significant influence on stress tolerance.

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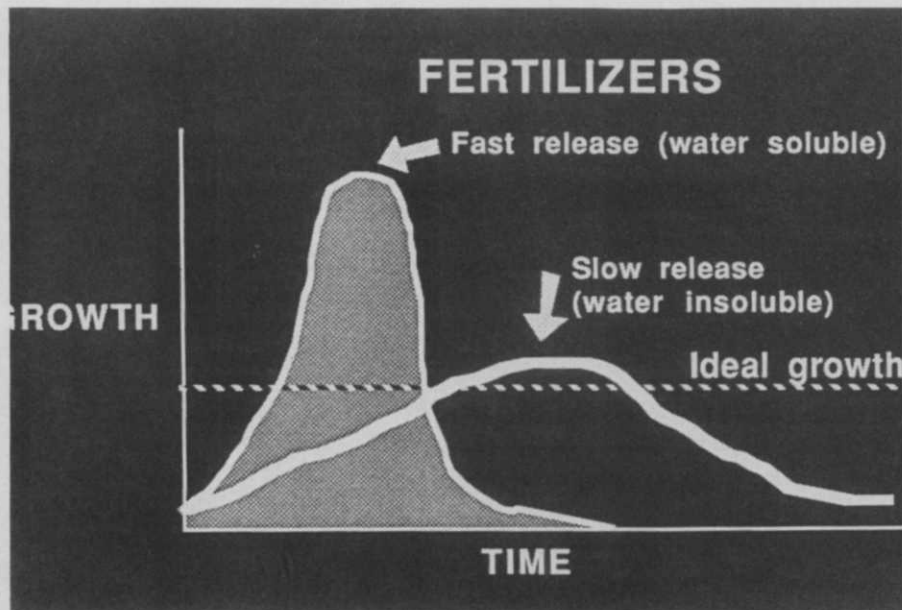


Figure 1. A slow to moderate, uniform growth is most desirable in turfgrass fertilization programs. Nitrogen is the "growth control" element.



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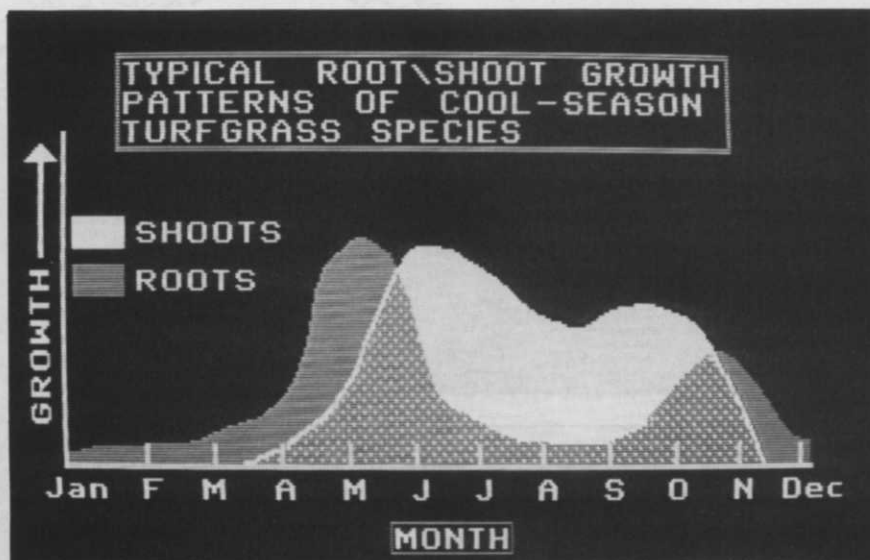


Figure 2. Root growth of cool-season grasses is greatest in the spring with a significant root growth surge again in the fall.

Timing of nitrogen applications is critical to a healthy turf with maximum stress tolerance. Heavy nitrogen fertilization during the spring and early summer is undesirable for cool-season turfgrasses. Environmental conditions are favorable for a rapid topgrowth surge at the expense of root growth. Lush, succulent growth is also produced from heavy nitrogen in the spring. This takes the turfgrass into the summer in a soft growth condition and more vulnerable to disease, heat and drought.

To avoid these latter disadvantages, late-season fertilization has been adopted for cool-season grasses. Late-season fertilization means application of nitrogen during that period of the year (late fall) that will favor root growth over shoot growth, and favor a positive carbohydrate balance in the turfgrass plant.

Cool-season turf shoot and root growth occur most readily in temperatures of 60 to 75 and 50 to 65 degrees Fahrenheit, respectively. Research at Ohio State University has shown that root growth of cool-season grasses will continue at soil temperatures close to freezing. Shoot growth will slow and eventually cease long before soil temperatures drop low enough to stop root growth. Roots can be actively growing while shoots above are brown and dormant. Late-season fertilization capitalizes on this differential in optimum temperatures and minimum temperatures for growth of shoots versus roots.

For the "late-season" concept to work successfully, turf must be green when the late-season nitrogen application is made.

On cool-season grasses, a late sum-

mer/early fall nitrogen application will ensure that the turf remains green before the late-season application.

Ideally, the late-season nitrogen application should be made when vertical shoot growth has stopped, but the turf is still green to produce carbohydrates via photosynthesis.

Air temperatures of 45 to 50 degrees Fahrenheit are usually neces-

sary to ensure vertical shoot growth stoppage of cool-season grasses. Since temperatures will be at a point that stops roots, cool-season grass rhizomes and stolons will capitalize on any applied nitrogen and carbohydrate produced. The carbohydrate produced by the green turf will be more efficiently used for root, rhizome and stolon growth during the late fall, winter and spring.

Research at Ohio State University has shown a significant increase in both root growth rates and root numbers (Figures 3 and 4) from late-season nitrogen fertilization. A more positive carbohydrate balance also was provided from late-season fertilization compared to a spring/summer fertilization.

Nitrogen applications during the late season, if timed properly, will extend greening later into the fall and winter. Spring green-up will usually occur earlier.

In general, the turf's "greening period" from late-season fertilization can be extended four to eight weeks during late fall and early spring. This is a sound practice both agronomically and aesthetically.

Typically, spring color of late-season fertilized turf remains quite good until late May or early June. Then the effects of nitrogen applied the previous fall begin to wear off. Spring appli-

Poor fertilizer performance? It might be ammonia volatilization

Nitrogen loss from ammonia volatilization can result in poor fertilizer performance, according to David Kissel, researcher at Kansas State University.

Kissel says that as in leaching, losses of nitrogen by ammonia volatilization can make it necessary to re-apply fertilizer to restore the lawn to its original green color and vigorous growth.

Ammonia volatilization occurs when nitrogen is converted to a gas and released into the air. This nitrogen removal bypasses the turf and deprives a lawn of needed nutrition. Of the 16 elements needed for healthy turf development, nitrogen is by far the most important.

"Ammonia volatilization can take place when urea and urea-containing fertilizers are present on turfgrass surfaces, in the thatch layer, or very near the soil surface," he says. Non-urea fertilizers are also susceptible to nitrogen losses from ammonia volatilization, but only when applied to the surface of alkaline soils.

Along with heavy thatch, a lack of rainfall or irrigation will increase the chances for nitrogen loss from ammonia volatilization because movement of applied fertilizer into the soil will be reduced. Kissel says that substantial losses can be avoided if irrigation or rainfall occurs within a few hours after fertilizer application.

If irrigation is not possible, and conditions are favorable for loss, he recommended using non-urea nitrogen or slow-release fertilizer, such as sulfur-coated urea or some of the new products, like N-Sure nitrogen solution, in combination with the regular nitrogen source.

Kissel addressed the ammonia volatilization problem at the Kansas Turfgrass Foundation meeting in Wichita, Kan. □



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Table 2:
Comparative Turfgrass Responses of Commonly Used Maintenance Nutrients — Nitrogen, Phosphorus and Potassium.

Turfgrass Response	Nutrient		
	Nitrogen	Phosphorus	Potassium
Shoot Growth	*		
Shoot Density	*		
Grass Color (Green)	*		
Root Growth	*	*	*
Establishment Rate	*	*	
Recuperative Rate	*		
Wear Tolerance	*		
Heat Stress	*		*
Drought Stress	*		*
Cold Stress	*		*
Disease Incidence	*		*

* Fairly strong relationship based on available research.

Table 3:
Nitrogen treatment effects on a Merion Kentucky bluegrass sod.

Nitrogen Rate	Annual Clipping Yield (dry wt.)	Nitrogen Content in Clippings	Sod Strength	Rhizomes
lb/A/month	lb/A	%	lb to tear	grams
0	463	3.0	146	99
15	1807	3.3	188	89
30	2555	3.6	130	120
60	5676	4.5	97	43
120	8447	5.4	67	14

Rieke, P. E. 1975. Turfgrass Fertilization - Nitrogen. 16th Illinois Turfgrass Conference Proceedings. 81-85.

Table 4:
A Comparison of Known Late-Season Fertilization Advantages on Cool- Versus Warm-Season Grasses.

Late-Season Effect	Cool-Season Grass Response	Warm-Season Grass Response
Winter hardiness	+ -	-
Rooting	+	
Carbohydrate balance	+	
Fall color retention	+	
Spring greenup	+	+
Spring mowing reduction	+	+
Turf density	+	+
Weed reduction	+	
Disease reduction	+	
Thatch accumulation	+	

Plus (+) denotes a positive response, negative (-) denotes a negative response, (+ -) denotes a limited response and a blank indicates research information limited.

cations of nitrogen should be delayed until the late-season fertility response dissipates.

The most efficient nitrogen sources for late-season fertilization programs are independent of temperature for nitrogen release. Soil temperatures and microbial activity are low at this time of the year, resulting in poor efficiency from temperature-dependent fertilizers like ureaformaldehyde.

Urea, IBDU, sulfur-coated urea and short chain methylene ureas will work effectively in this program. Recommended nitrogen rates are 1½ lbs. per 1,000 sq. ft.

In Ohio State University research, thatch has been found to be greater under late-season fertilization than under spring/summer fertilization. This has been the only disadvantage reported for late-season fertilization in cool-season grasses. The greater root growth occurring with late-season fertilization is considered the likely reason for more thatch. Thatch has been reported to consist of as much as 60 to 70 percent roots.

Management practices like late-season fertilization or high mowing that increase root depth and number will, more than likely, over time, increase thatch accumulation.

This implies that, in long-term management strategies where cultural practices maximize root growth, accompanying strategies like core cultivation must be used to control thatch.

Limited information is available on the adaption of warm-season grasses to late-season fertilization. Some of the advantages claimed on cool-season grasses will provide similar benefits on warm-season grasses (Table 4), such as extended greening and earlier spring green up. Winter injury and winter hardiness are major concerns, however. In general, late-season fertilization will lower the winter hardiness of warm-season grasses by delaying or interfering with the hardening process.

This will result in a greater risk of injury, especially as in the northern limits of the transition zone. Turf managers must weigh the benefits against the risks.

Potassium fertilization

Turfgrasses need potassium in relatively large amounts, second only to nitrogen. The potassium content of properly fertilized turfgrasses normally ranges from two to three percent. Potassium in maintenance fertilization programs has generally been applied in a ratio of 3:1:2 to 5:1:2, nitrogen-to-phosphorus-to-

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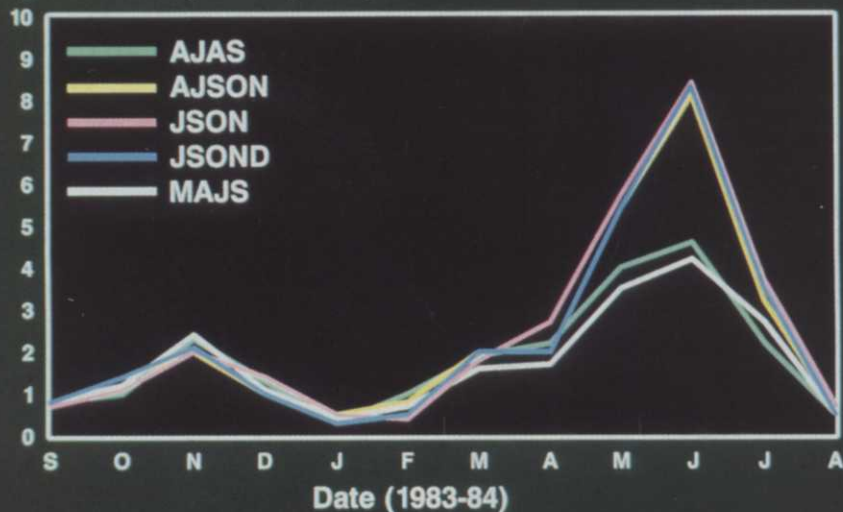
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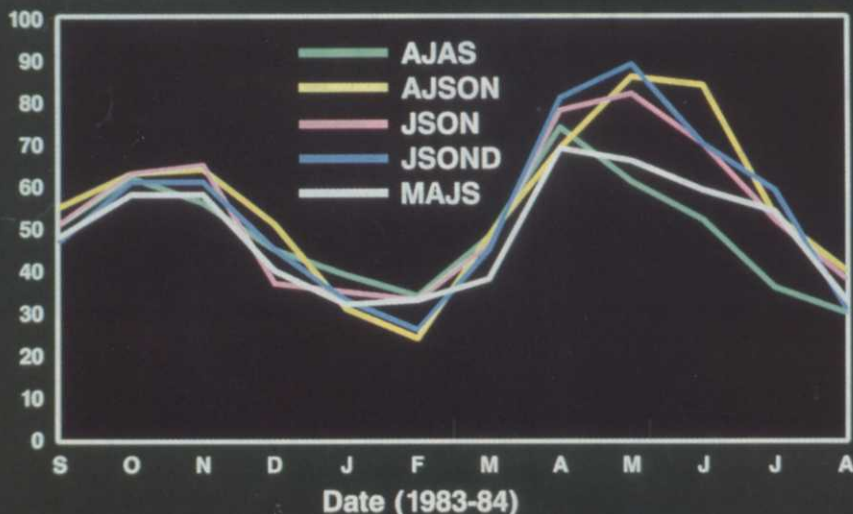
EFFECTS OF N TIMING ON ROOT ELONGATION RATE OF KENTUCKY BLUEGRASS

Elongation Rate (mm/day/root)



EFFECTS OF N TIMING ON ROOT NUMBER OF KENTUCKY BLUEGRASS

Active Root Number



Figures 3 & 4. Late-season fertilization (O, N and/or D) significantly increased root elongation rates and root number during the following spring and early summer. Nitrogen was applied at one pound rates during the months indicated.

potassium. On low potassium soils, additional potassium may be necessary.

Recent research has demonstrated that increasing potassium levels result in improved root growth; an enhancement of heat, cold and drought tolerance; better wear tolerance and less chance of disease.

This research suggests a nitrogen-to-potassium ratio approaching 1:1.

Higher analysis potassium fertilizers will be most beneficial before and during stress periods. Higher potassium levels prior to winter have been found to be extremely beneficial to warm-season grasses. They enhance winter hardiness and would certainly seem warranted in late-season fertilization of warm-season grasses.

Phosphorus fertilization

Phosphorus usually enhances turfgrass establishment rate from seed or vegetative plantings and enhances root growth. In maintenance fertilization programs, phosphorus has generally been applied in ratios of 3:1:2 to 5:1:2 nitrogen-to-phosphorus-to-potassium.

Nitrogen-to-phosphorus ratios of 1:1 to 1:2 are recommended in establishing new turfgrass areas. Phosphorus deficiencies are, however, rarely observed in established turf areas unless their level in the soil is extremely low or an unfavorable pH exists.

Micronutrients

Micronutrient levels are usually adequate in most soils. In addition, these nutrients are needed in very small quantities. They are often supplied as impurities in commonly-used fertilizers, liming materials, top dressing, certain pesticides and irrigation water.

Sandiness increases the possibility for micronutrient deficiencies. However, most sands used for soil modification are not pure and are usually modified to some extent with soil or organic matter.

Thatch has been found to be greater under late-season fertilization than under spring/summer fertilization.

In general, micronutrient deficiencies are most likely to occur in alkaline soils (high pH). They are further aggravated by high soil phosphorus and high soil levels of other micronutrients. It is advisable to use both soil and tissue testing to define a micronutrient deficiency.

Iron is the micronutrient most frequently supplemented in turfgrass fertilization programs. Its more frequent use among micronutrients is primarily due to its capability to enhance turfgrass color.

Iron application of 1 to 2 oz. of iron carrier per 1,000 sq. ft. produces a relatively rapid dark greening response with a short residual of one to three weeks. Iron has been known to have positive influence on plant carbohydrate reserves. It more recently has shown to have a positive effect on drought hardiness.

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housands of people pass under this bridge during the annual Great Atlanta Raft Race. The Span-Rite bridge from GameTime connects the banks of the Chattahoochee River, which winds through the national recreation area in Atlanta, Ga. The federal park area consists of 14 park units stretching 48 miles and totalling 4,000 acres. Hikers and picnickers cross over this five-year-old pedestrian bridge in the Powers Island unit. The bridge is 120 feet long and eight feet wide. It's pressure-treated southern yellow pine wood deck and sandblasted structural steel railing blend in with the natural setting. The surrounding woods consist of pine and hardwood trees, including maple and oaks.

GameTime Bridges:

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BRID

T · H · E

by Heide Aungst,



A

t the turn of the century, a railroad bridge stretched across Boulder Creek. The city of Boulder, Colo. replaced it with a footbridge. When that degraded, the city decided to renovate the bridge and the surrounding areas. Today, greenery highlights five major parks running throughout Boulder. The city completed the \$3.2 million parks project in 1987, after two years of work. City employees did all the design and landscaping for the new park system. Bicyclists and pedestrians on the Boulder Creek Path pass over several bridges. This bridge, manufactured by Continental, connects all the municipal offices. The bridge is 58 feet long and eight feet wide. It's made of treated Douglas fir timber with a 3X12 planking and black steel railing. It holds a 10,000 lb. vehicle load. The bridge cost \$7,323, but the total price, including installation came to more than \$25,000. The city park crew cares for the surrounding bluegrass turf and cottonwood trees.

Continental Bridges:

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GING

G · A · P

managing editor

S

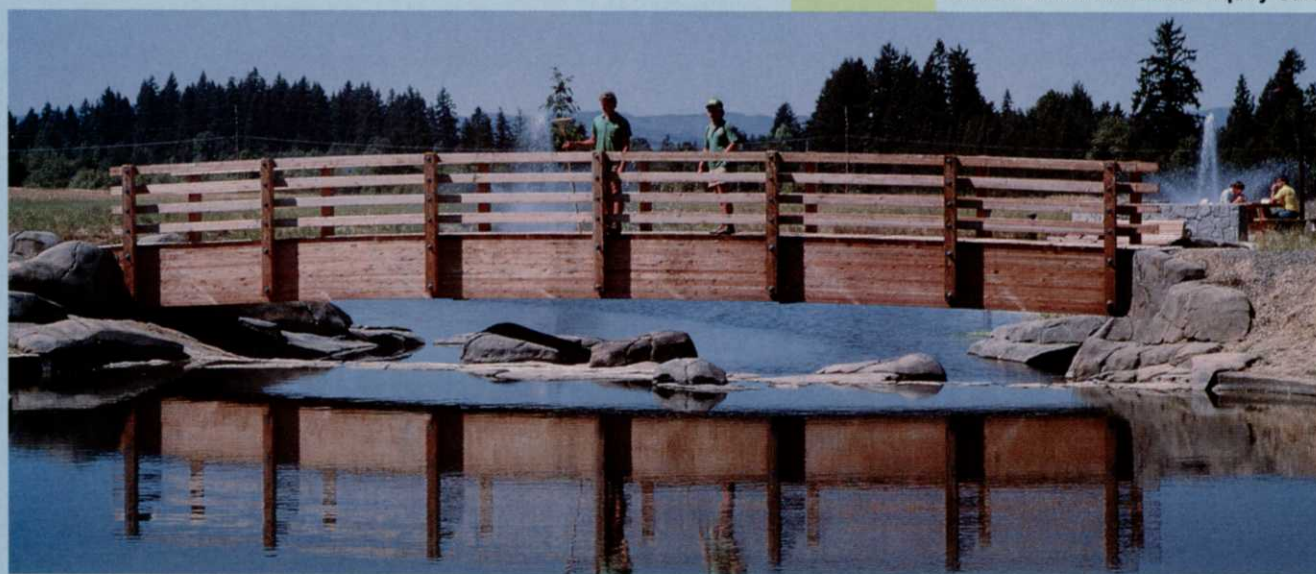
tudents and researchers alike enjoy this bridge while jogging and biking through the Oregon Graduate Center Science Park in Beaverton, Ore. The Western Wood Structures' bridge spans 45 feet over Commons Lake. It has a six-foot walkway, 42-inch high pedestrian rail, and holds an 85 PSF live load. The 1½-acre lake gets its name from the 15-acre Commons area in the center of the park. Landscape architect Mark Hadley of Wilsey and Ham designed the project. The three-level lake works as a water feature as well as a reservoir for park irrigation. The architects planted 20- to 25-foot Douglas fir and pine trees to fit in with the existing landscape. The bridge, installed in September 1986, cost \$8,400, not including the foundations.

Western Wood Structures:

Circle No. 190 on Reader Inquiry Card

Wilsey and Ham:

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G

olfers aiming for the No. 5 hole on the Wayne Public Golf Course in Bothell, Wa., might walk over this bridge to retrieve a ball. In fact, skin divers have been known to fish for missed balls in the Semmamish Slough river. The course installed the bridge in the spring of 1987 when the old bridge started decaying after 25 years. The deck, which is 142 feet long and seven feet wide, is concrete to prevent golfers' cleats from digging into the wood. Tye Timber supplied the Douglas fir wood railing, while the Wycoff Co. treated the wood used on the bridge. Centrac engineering designed and built it. The golf course turf near the bridge is *Poa annua*.

Tye Timber:

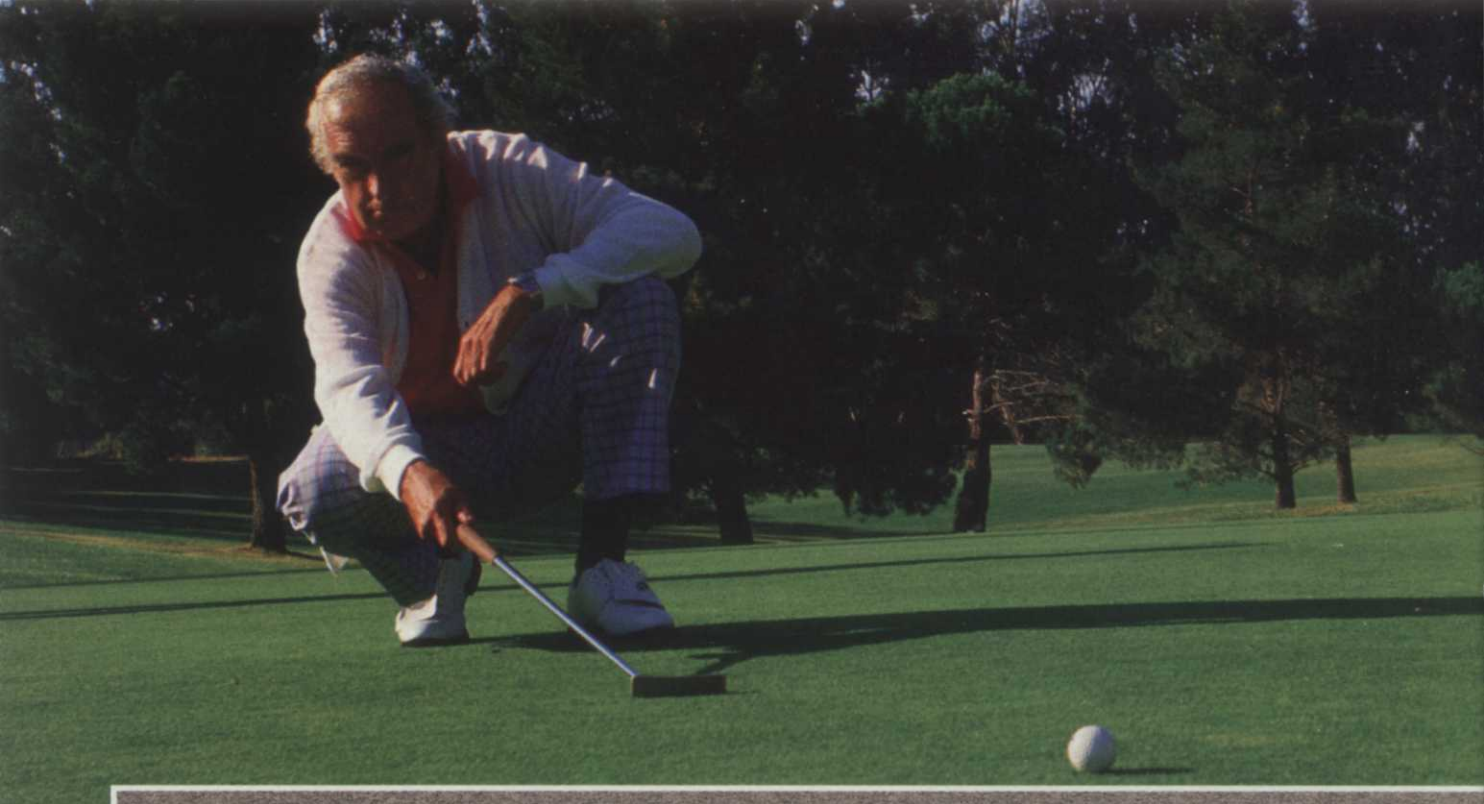
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PRE-EMERGENCE WEED CONTROL IN COOL-SEASON TURF

Pre-emergence herbicides are generally safer to use on turf than post-emergence herbicides because they are being used to control seedlings rather than mature plants. Here are some tips.

by Prasanta C. Bhowmik, Ph.D., University of Massachusetts

Weeds are a fact of life. No turfgrass area or landscape will remain weed-free without intervention.

To establish and maintain an attractive, healthy lawn, weeds must be controlled. Maintenance practices such as mowing too low, over-irrigation, over-fertilization, using unnecessary heavy machinery, and poorly timed aerification can result in stress conditions that encourage

weed infestations.

A good management program with both cultural and chemical program will help reduce these stress factors. A successful weed control program in cool-season turf results from integrating a recommended cultural practice program and a complete weed control program.

An effective weed control program uses herbicides only when necessary. Producing a dense, healthy stand of

turfgrass is one way to control annual grassy weeds and other broadleaf weeds. Proper mowing height and frequency, fertilization and irrigation are part of the weed control program and should be practiced throughout the growing season.

Turfgrass managers should be familiar with the following steps for a successful weed control program.

1. Knowing the specific weed problems: in relation to weed identification (grassy weeds vs. broadleaf weeds), life cycle of the weeds (annuals vs. perennials).

2. Selection of the right herbicide: in relation to effective weed control, turfgrass tolerance.

The most common annual grassy weeds include large crabgrass, small crabgrass, yellow foxtail, green foxtail, fall panicum, barnyardgrass and goosegrass. Crabgrass and goosegrass are the most troublesome weeds in turf. Crabgrass (*Digitaria spp.*) is among the most difficult weeds to control in turf.

In northern regions, seeds of crabgrasses (smooth and large) begin to germinate in late April to late May and continue to germinate throughout the summer. However, in transition regions, germination can occur as early as late March. Crabgrass germination is related to soil temperature. When the soil temperature reaches 65°F crabgrass begins to germinate.

This varies with the local conditions of soil type, rainfall, and weather in the spring. In general, most



This picture, taken 10 weeks after a pre-emergence herbicide application, shows the effective control of annual grassy weeds.

crabgrass seeds germinate during a six- to eight-week period. And most other annual grassy weed seeds germinate during this germination period.

Selective weed control

The selective control of these grassy weeds and some broadleaf weeds can be obtained with pre-emergence herbicides. Pre-emergence herbicides provide effective control for several weeks or months, depending upon dosage and products.

The effectiveness of these compounds is based upon their ability to provide good weed control, turfgrass tolerance, and long residual control. The primary pre-emergence herbicides for grassy weed control in cool-season turfgrasses are benefin, bensulide, DCPA, oxadiazon, pendimethalin, and siduron (Table 1).

Benefin, Team (a pre-mix combination of benefin and trifluralin), DCPA is also effective in controlling common chickweed, carpetweed and common purslane.

In addition, pendimethalin controls goosegrass, barnyardgrass, fall panicum and some annual broadleaf weeds such as hop clover, yellow woodsorrel and prostrate spurge. Pendimethalin applied during the late summer to early fall can control common chickweed, mouseear chickweed, and henbit. Repeat application at the recommended rate eight weeks after the initial application may prevent goosegrass and heavy infestations of spurge. Oxadiazon controls hop clover, prostrate spurge and speedwell. Oxadiazon is more effective in goosegrass control than DCPA. Pendimethalin and DCPA control prostrate spurge, while benefin and bensulide are ineffective in controlling this weed.

Prodiamine (Blockade) is a new pre-emergence herbicide. It is expected to be in the market in the near future. It is very effective in controlling most annual grassy weeds such as crabgrass, goosegrass, bluegrass and several broadleaf weeds. It provides long residual control of weeds.

Timing applications

Timing is very important for herbicide applications. The best time for annual grassy weed control is to apply before weeds emerge. The key point is that pre-emergence herbicides need to be applied before grasses germinate in the spring. Treatments made too late (i.e. after germination) will not control emerged grassy weeds.

If application timing does not coincide with the normal germination period of annual grassy weeds, weed

Table 1.

Common name, trade names, formulations, and rate of pre-emergence herbicides.

Common Name	Trade Name(s)	Formulation	Recommended Rate (pound active per acre)	Company
Benefin	Balan	2.5G	2.0-3.0	Elanco
		2.5G	"	Lesco
Benefin & Trifluralin	Team (1:2)	2G	1.5-3.0	Elanco
		1G	"	Lesco
Bensulide	Betasan	4E, 7G, 12.5G	7.5-10.0	ICI
	Pre-san	4E, 7G, 12.5G	"	Mallinckrodt
	Lescosan	4E, 7G, 3.6G	"	Lesco
	Betamac	4E	"	PBI Gordon
	Weedgrass Preventer	8.5	12.5	Scotts
DCPA	Dacthal	75WP	10.5	Fermanta
	Dacthal	5G	"	Lesco
Oxadiazon	Ronstar	50WP, 2G	3.0-4.0	Rhone Poulenc
Oxadiazon + Bensulide	Goosegrass/ Crabgrass Control	6.56G	7.5	Scotts
Pendimethalin	Lesco Pre-M Weedgrass Control	60DG,	1.5-3.0	Lesco
	Halts	60WDG	"	Scotts
	Crabgrass Turf Weedgrass Control	2.45G	"	Scotts
		1.71G	"	Scotts
Siduron	Tuperson	50WP	2.0-6.0	Du Pont

control results may be erratic or poor. In general, pre-emergence herbicides should be applied two weeks prior to the expected weed seed germination period. Therefore, the application dates of pre-emergence herbicides will vary from one part of the country to another.

The herbicides should be watered-in so that the chemical can form a barrier in the soil prior to weed seed germination. The resulting chemical barrier should not be disturbed during key weed germination period.

Complementary effects

Post-emergence grass control can complement a pre-emergence weed control program when poor weed control results are obtained. The primary post-emergence herbicides for grassy weed control in cool-season turfgrass are the arsenates: MSMA, DSMA, and AMA. These compounds can be phytotoxic, especially when applied during hot weather. A new post-emergence herbicide, fenoxaprop (Acclaim) is now available for annual grassy weed control. Fenoxaprop is very effective in large crabgrass, goosegrass, fall panicum, giant foxtail, barnyardgrass and other grassy weed control. This compound offers a wider window of post-emergence control than the arsenates with less potential for turfgrass injury. Fenoxaprop is

recommended for use on perennial ryegrass, fine fescue, tall fescue and Kentucky bluegrass turf.

Longevity of pre-emergents

A complete weed control program aims at controlling weeds for the entire season. Season-long control of weed species is dependent upon the activity and longevity of the herbicide in use.

Oxadiazon, pendimethalin, Team and bensulide provide long residual weed control, while benefin is of short residual. On the other hand, DCPA is an intermediate type. Turfgrass managers should keep in mind that soil residual activity is also dependent upon the rate of herbicide being used.

In general, the higher the rate of application, the longer is the residual control over the growing season. Initial application determines the concentration in the soil for pre-emergence activity. It must maintain a critical soil residue level during the growing season for season-long weed control.

Turfgrass managers should keep in mind that application made early in the season may break in the soil to below the threshold level. When this occurs, one can expect less than desirable control following late germinating weeds. Repeat application of certain herbicides may be made 10 to

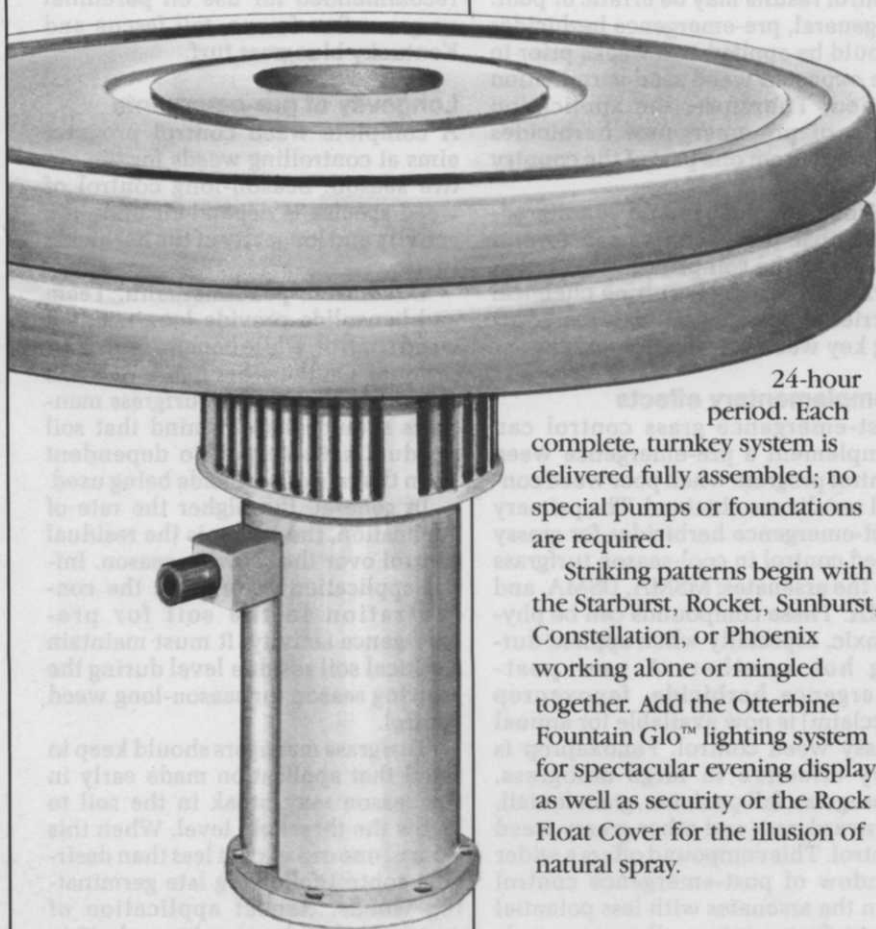
continued on page 55

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Turfgrass tolerance

Cool-season turfgrasses vary in their tolerance to pre-emergence herbicides. Siduron is the only pre-emergence herbicide that is recommended for newly-seeded turfgrass. All other pre-emergence herbicides are recommended for use on established fine fescues, Kentucky bluegrass, perennial ryegrass and tall fescue. How-

In general, the higher the rate of application, the longer is the residual control over the growing season.

ever, bensulide and DCPA can be applied in the spring following a fall seeding of cool-season turfgrasses.

Pendimethalin is not recommended for use on bentgrass or where annual bluegrass is the desired species. Benefin, DCPA and oxadiazon are not recommended for use on fine fescues or bentgrass turf. However, bensulide can be used on bentgrass. Team is recommended for use on most cool-season grasses. It may thin established annual bluegrass turf and fine fescues at rates above 1½ lbs. active ingredient per acre.

It should not be applied in the spring to turfgrass planted the previous fall. Team is not recommended for use on creeping bentgrass. However,

it can be used on bentgrass fairways.

Reseeding time interval

Time for reseeding is very important in relation to the application date of pre-emergence herbicides. In general, pre-emergence herbicides persist in the soil for a length of time, allowing season-long weed control. Reseeding

interval is dependent upon the herbicide and dosage used (Table 2).

For example, reseeding should be delayed at least six weeks after application of Team at the lower end of recommended rate. However, when using the highest recommended rate, reseeding should be delayed 12 to 16 weeks after the application. When reseeding, it is essential that proper cultural practices such as soil cultivation, irrigation and fertilization be followed.

In summary, a successful pre-emergence weed control program results from selecting the right herbicide and applying it uniformly at the proper time and appropriate dosage. The herbicide selection depends on the weeds to be controlled and the turfgrass to be treated.

Choose the most effective herbicide with maximum safety to the turfgrass. Changing the use of one class of herbicide to another class in a weed management program may provide a broad spectrum weed control in lawns. For crabgrass and other grassy weed control, turf managers and lawn care operators should emphasize a pre-emergence herbicide program along with a good management program. This approach will minimize the competitive advantage of efficient species like crabgrass.

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Table 2.

Minimum time necessary for reseeding after various pre-emergence herbicide application.

Common Name	Trade Name(s)	Formulation	Recommended Rate (pound per acre)	Minimum Time Before Reseeding (Weeks)
Benefin	Balan	2.5G	2.0-3.0	6
Benefin & Trifluralin	Team (1:2)	2G	1.5-3.0	6
Bensulide	Betasan	4E, 7G, 12.5G	7.5-10.0	16
DCPA	Dacthal	75WP	10.5	8
Oxadiazon	Ronstar	50WP, 2G	3.0-4.0	16
Oxadiazon + Bensulide	Goosegrass/ Crabgrass Control	6.56G	7.5	16
Pendimethalin	Lesco Pre-M	60DG,	1.5-3.0	16
Siduron	Tuperson	50WP	2.0-6.0	N/A

PRE-EMERGENCE WEED CONTROL FOR WARM-SEASON TURF

by Clyde Elmore, Ph.D., University of California-Davis



Crabgrass will germinate in open areas of turf.

Pre-emergence weed control is more than applying the right herbicide at the right rate. It requires a knowledgeable turf manager. Often the manager must be able to manage the turf for multiple uses such as recreation, visual effects and athletic events.

Frequently, several species are involved. Knowing cultural practices needed to make the turf vigorous without inviting damage from diseases or other stresses is essential. Management practices are generalized about mowing height and frequency, fertilization amount, and frequency, time of aeration and irrigation. These practices need to be site-specific. Assuming all of the practices are correct, the manager must then think of tipping the balance against weeds.

Before beginning a weed control

program, determine the weed species to be controlled using identification aids.

Local university advisors, nurserymen, industry representatives or people at the botanic gardens are available to assist. If there are many species or if perennial weeds are present, a single pre-emergence material will not be adequate.

Choosing a herbicide

Many herbicides are available for warm-season turf. They differ by the weeds controlled, their safety to the various turf species and residual control. Some herbicides (atrazine, simazine and pronamide) also give some post-emergence control.

	Prostrate Spurge Control	Crabgrass Control
EXCELLENT	Pendimethalin	Bensulide, pendimethalin, oryzalin, trifluralin
GOOD	DCPA	Benefin, siduron, oxadiazon, DCPA, napropamide
FAIR	Oxadiazon, siduron	
POOR	Bensulide, napropamide	

(Based on consistence, length of control, and completeness of control)

Pre-emergence materials form the basis for controlling annual grass and many broadleaf weeds in turf. Once the weeds are controlled and the management practices have been changed to keep the weeds from re-invading, then good vigorously-growing turf can exclude most weeds.

Herbicides are applied in the spring to control summer annual grasses or broadleaves. They are applied in the fall for winter annuals. The germination times of large crabgrass, smooth crabgrass, prostrate spurge, goosegrass or foxtails all differ.

Timing applications

The manager must be able to time the application so the herbicide is in the germination zone at the first germination. One application may not be long enough to control the weeds for the full season, as is often the case in southern California, Texas, Florida, Georgia, etc.

These areas have an exceptionally long weed germination period. Since the soils are warmer and the temperature higher, herbicides degrade faster than in cooler climates. Greater amounts of water increase the loss of herbicides. A second application must be made to have enough herbicide in the germination zone to control all weeds.

The turf manager can affect timing of germination by turf quality. Areas

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Table 1.

Directory of turfgrass pre-emergence herbicides.

Common Name	Trade Name	Formulations	Company
Atrazine	Aatrex	80W,90DG,4L	Ciba-Geigy
Benefin	Purge	4L	Security
	Balan	2.5G	Elanco
	2.5 Benefin Granular	2.5G	Lesco
Benefin + oryzalin	XL	2G	Elanco
Benefin + trifluralin	Team	2G	Elanco
Benefin + oxadiazon	Regalstar		
Bensulide	Betasan	2.9E,4E,7G,12.5G	Stauffer
	Iescosan	4E,7G,12.5G	Lesco
	Pre-san	4E,7G,12.5G	Mallinckrodt
	Bensumec 4LF	4E	
Bensulide + Oxadiazon	Goosegrass/Crabgrass Control	5.25G + 1.31G	Scotts
DCPA	Dacthal	75W	Fermenta
	Dacthal	5G	Lesco
Ethofumesate	Prograss	1.5E	Nor-Am
Fenarimol	Rubigan	50W	Elanco
Napropamide	Devrinol	50W,5G	Stauffer
Oryzalin	Surflan	4AS	Elanco
Pendimethalin	Southern Weedgrass Control	2.5G	Scotts
	Turf Weedgrass Control	1.71G	Scotts
	Weedgrass Control	60DG	Scotts
	Pre-M	60DG	Lesco
	Pendimethalin	60DG	Clean Crop
Pronamide	Kerb	50W	Rohm-Haas
Siduron	Tupersan	50W	Du Pont
Simazine	Princep	80W,90DG,4L,4G	Ciba-Geigy

that have bare soil warm up quicker in the spring and weeds germinate in these areas before cooler, tight-growing areas. With good quality turf, the herbicide can be applied later giving better control that lasts longer.

Pre-emergence herbicides are usually used in the early spring for crabgrass (large and smooth), goosegrass, sandbur, foxtails and prostrate spurge.

Knotweed can sometimes be a problem. In the fall of the year, materials are used for annual bluegrass, common chickweed, henbit and speedwells.



Goosegrass should be treated in the early spring with a pre-emergence herbicide.

continued on page 59

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Other weeds can be found locally, or are isolated problems. If perennial weeds have been established in the turf and have seeded, then pre-emergence herbicides may be needed to control the germinating seeds of these weeds (Dallisgrass or Bermudagrass for example). The established plants must be controlled by post-emergence herbicides.

Overseeded turf

Overseeding of warm-season grasses is a concern when using herbicides. The pre-emergence material controlling crabgrass or goosegrass must be broken down so annual ryegrass can germinate and establish. Applications of herbicides for annual bluegrass control can be a problem.

Benfen has been used for annual bluegrass control. It can also be applied early in the season (August), giving early control. The ryegrass can be seeded about 45 days later. Bensulide has stunted overseeded ryegrass turf at 45 days. The residual of bensulide is usually two or three times longer than benfen in California turf.

Ethofumesate may be applied 20 to 30 days after overseeding. It should be applied to dormant Bermuda or suppression can occur in the spring.

Fenarimol, a fungicide, applied two weeks prior to overseeding, controls several turf diseases in addition to controlling the annual upright form of annual bluegrass. It has not controlled the low-growing perennial form in mild climate areas.

Careful water management going into the fall will help reduce annual bluegrass invasion. Conditions that allow alternate wetting (rainfall or irrigation) and drying, so the seedlings

can dry out and die, will decrease weed populations.

Mechanical cultivation

Also, timing of aeration or other mechanical cultivations is important. Aeration or verticutting during annual bluegrass germination allows

Table 2.

Tolerance of Warm-Season Turf to Pre-emergence Herbicides

Herbicide	Bahia	Bermuda	Centipede	St. Augustine	Zoysia
Atrazine	NR	I	T	T	I
Benfen	T	T	T	T	T
Benfen*oryzalin	T	T	T	T	T
Benfen*trifluralin	T	T	T	T	T
Bensulide	T	T	T	T	T
Bensulide*oxadiazon	NR	T	NR	NR	T
DCPA	T	T	T	T	T
Ethofumesate	NR	I	NR	NR	NR
Napropamide	T	T	T	T	TR
Oryzalin	T	T	T	T	T
Oxadiazon	NR	T	NR	T	T
Oxadiazon*benfen	NR	T	NR	NR	T
Pendimethalin	T	T	T	T	T
Pronamide	NR	T	NR	NR	NR
Siduron	NR	NR	NR	NR	NR
Simazine	NR	T	T	T	T

T = tolerant; I = Intermediate tolerance, apply only to dormant grass
NR = Not registered

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	Pre-emergence Herbicide Soil Longevity
SHORT	benfen, DCPA, siduron
MEDIUM	oxadiazon, trifluralin
LONG	bensulide, pendimethalin, oryzalin

(Based on turf use and rates used in turf)

open spaces in the turf for weeds to invade.

Always aerate or verticut before—never after—an application of pre-emergence herbicide. These operations just before herbicide treatment will reduce the thatch and give the herbicide a better chance to get to the soil where it is effective.

Pre-emergence herbicides, when properly timed at the right rate, can effectively control most annual weeds and be a good tool to help manage turf. They generally are safer to use on turf than post-emergence herbicides because they are being used to control seedlings rather than mature plants. There are many good materials from which to select to control your weeds. **LM**

TURFGRASS CULTURE AND WATER USE

Different turfgrass species use water in different ways.
New research helps to better explain this process.

by David Minner, Ph.D., University of Missouri

Over the last seven years, researchers have made advances in understanding turfgrass water use rate (WUR). Much emphasis is being given to the WUR associated with a particular turfgrass species, cultivar or cultural practice.

The idea is to develop grass systems that lose less water to the atmosphere and maintain more favorable

soil moisture condition for plant growth.

Indeed, these low water use grasses and management practices are being defined, but turfgrass managers must understand that low water use does not necessarily mean less irrigation.

For example, WUR of creeping red fescue is nearly 15 percent less than that of tall fescue. But less water is

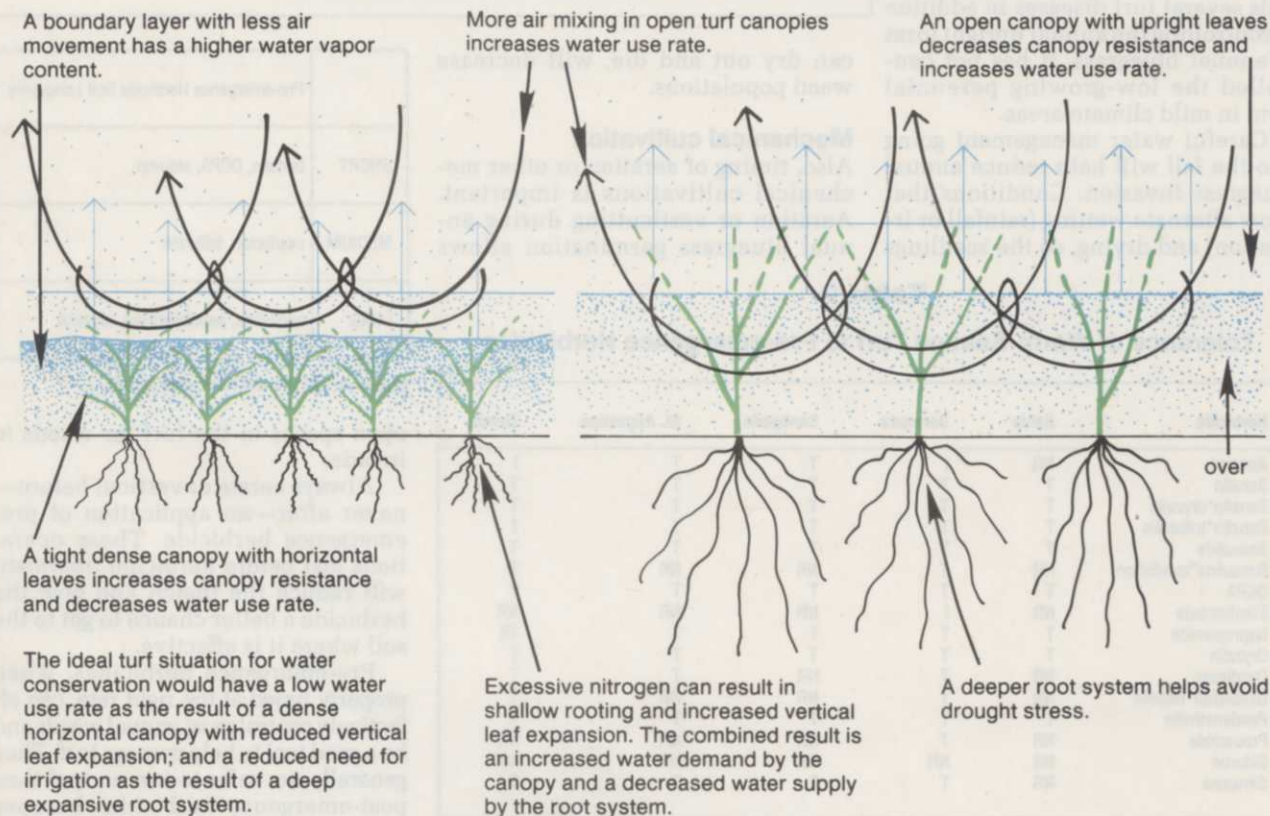
needed by tall fescue to keep it at acceptable turf quality than the creeping red fescue.

Similarly, taller mowed grasses have higher WUR than shorter mowed grass, but the amount of irrigation needed to keep turfs at acceptable levels is less for the taller grass than the shorter.

In both examples, a deeper root system associated with tall fescue and

continued on page 62

A RELATIVE COMPARISON BETWEEN TURFGRASS GROWTH AND WATER USE



Important Note: The intent of the above diagram is to show the relationship between turfgrass growth and water use. It should be understood that a decreased water use rate does not always result in water conservation and a reduced need for irrigation.

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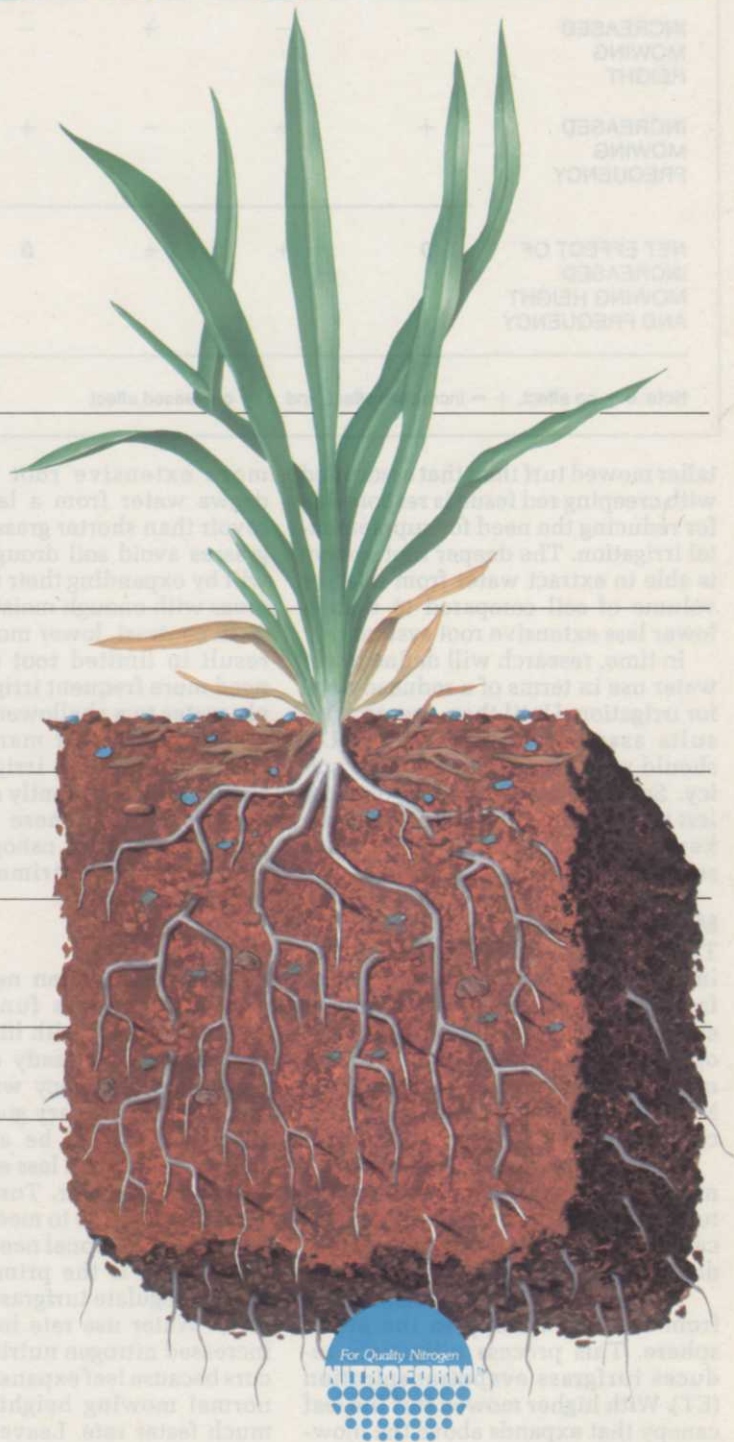
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THE EFFECT OF MOWING ON TURFGRASS WATER USE RATE AND SUPPLEMENTAL IRRIGATION NEEDS

	SHOOT DENSITY	CANOPY RESISTANCE	ROOT DEPTH	WILTING TENDENCY	WATER USED BY TURF (WUR)	IRRIGATION		
						FREQUENCY	AMOUNT PER IRRIGATION	TOTAL
INCREASED MOWING HEIGHT	-	-	+	-	+	-	+	-
INCREASED MOWING FREQUENCY	+	+	-	+	-	+	-	-
NET EFFECT OF INCREASED MOWING HEIGHT AND FREQUENCY	0	+	+	0	+	-	+	-

Note: 0 = no effect, + = increased effect, and - = decreased effect

taller mowed turf than that associated with creeping red fescue is responsible for reducing the need for supplemental irrigation. The deeper root system is able to extract water from a larger volume of soil compared to a shallower less extensive root system.

In time, research will define lower water use in terms of a reduced need for irrigation. Until then, research results associated only with WUR should not become management policy. Soil and plant systems that use less water and need less irrigation are key components of a water conservation program.

Mowing

The two major aspects of mowing that influence water use are height and frequency. Grasses mowed at higher cutting heights have a reduced canopy resistance and, therefore, use more water than short mowed grass. Mowing frequently and short increases turf density.

Dense turf resists the upward movement of water vapor through the turf canopy. A dense turf with a tight canopy also resists air movement down into the turf canopy.

The net result is less moisture lost from the turf canopy to the atmosphere. This process ultimately reduces turfgrass evapotranspiration (ET). With higher mowed turf the leaf canopy that expands above the mowing height is less dense. This allows for more air mixing that results in higher water use rates.

It is important to note that taller grass transpires more water, but has a

more extensive root system that draws water from a larger soil reservoir than shorter grass. Thus, taller grasses avoid soil drought and plant wilt by expanding their roots into soil areas with enough moisture.

In contrast, lower mowing heights result in limited root systems that need more frequent irrigation to supply water to a shallower root system.

Therefore, turf managers interested in reducing irrigation needs should mow frequently at the highest feasible height. These management practices enhance canopy resistance and minimize detrimental rooting responses.

Nutrition

Fertilization is often needed to manipulate turfgrass function. Grass performing well with little help from fertilization is already at maximum water use efficiency with regard to quality. The primary goal of turf fertilization should be an increased shoot density with less emphasis on a darker green color. Turfgrass managers should strive to meet, but not exceed, the nutritional needs of the turf.

Nitrogen is the primary nutrient used to regulate turfgrass density and color. Water use rate increases with increased nitrogen nutrition. This occurs because leaf expansion above the normal mowing height occurs at a much faster rate. Leaves forced into this upper boundary layer lose water at a faster rate because they are in an area of greater air movement and reduced canopy resistance.

It is difficult to determine the level

of nitrogen that will result in efficient water use. Many factors such as soil type, organic matter content, turf species and cultivar and use are involved.

In general, the soluble component of a nitrogen fertilizer should not be applied at rates that exceed 1 lb. N/1000 sq. ft. per application. Over-stimulation of growth with nitrogen is easily detected by excessive vertical leaf growth and an increased need for mowing.

Under these conditions, turf will have high WUR, and rooting development will be reduced. In time, excessive leaf growth will demand a greater water supply that cannot be met by the reduced root system. Turf wilt occurs more frequently as this imbalance develops.

What follows is usually a decision by the turf manager to increase the frequency—and sometimes the amount—of irrigation to offset the symptoms of wilt.

In severe situations, excessive irrigation can lead to reduced oxygen levels in the soil. The end to this scenario is usually "wet wilt," which occurs when the plant's demand for water cannot be met even though soil is visibly moist.

In this case, a poor functioning root system resulted from an increased water demand. This increase was, in turn, caused by improper nitrogen fertilization and frequent irrigation. Turf managers interested in conserving water should use the lowest amount of nitrogen that gives the desired turfgrass quality and function.

Potassium and iron are two additional elements that may give the turf

continued on page 64

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Chemicals and turf water use

Various chemicals, such as pesticides and plant growth regulators (PGRs), are used in turfgrass management. Since they influence turfgrass growth, leaf area, rooting and canopy resistance, they also influence water use.

Anti-transpirants are not routinely used in turf culture but have received some attention since they have the potential to reduce ET. They reduce water use by inducing stomatal closure or by covering the stomata with a film.

Anti-transpirants may cause a detrimental effect on photosynthesis and evapotranspirational cooling. Manipulation of turfgrass morphology or canopy offers a greater potential for reducing ET than does regulation of stomatal functions by anti-transpirants.

Wetting agents have received limited testing in terms of water conservation. They do offer the advantage of increasing water infiltration rate on compacted soils, thatchy turf and hydrophobic sands.

Moving water into the soil faster may or may not effect ET. But it will make scheduling irrigation easier and reduce the chance for wasteful water runoff. Wetting agents used on steep slopes or mounded areas can reduce the need to over-irrigate or hand water contoured areas to maintain adequate soil moisture.

Pesticides are often needed in higher maintenance situations to provide a specific turfgrass function—generally improved appearance and density. In choosing a pesticide, more attention is given to efficacy. Little attention is given to what effect a product will have on the WUR, and more importantly the need for supplemental irrigation.

Herbicides, insecticides or fungicides are often applied alone or in combination with another. The information concerning the effect of pesticides on the WUR of turfgrass is limited.

At this time, we know that some pre-emergence herbicides cause reduced rooting. In high maintenance situations, reduced rooting may not evoke a visual response in turf appearance, since increased fertility and irrigation offset a decline in turf appearance.

As less water is available for turfgrass, additional injury from some pesticides may occur. Turf managers interested in conserving water

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WATER from page 62

manager an extra edge in managing turf exposed to drought stress. So far, research conducted in this area has shown improved turf performance under dry conditions, but no reports have documented the potential size for water conservation programs.

Potassium and iron have been reported to increase root growth which may account for their role in reducing wilt and improving drought avoidance. Reduced levels of nitrogen combined with iron can result in turf greening similar to normal rates of nitrogen. The implication here is that applications of iron plus nitrogen, especially in the spring, will result in a lower rate of vertical leaf growth and reduced WUR.

Irrigation

Current irrigation practices have probably evolved partly as a result of the equipment available for irrigation rather than a complete understanding of turfgrass water needs. Manual sprinkler systems, such as quick couplers, moveable pipe and traveling sprinklers required a lot of labor for a single irrigation. With these systems, it was desirable to provide as much water as possible during a single irri-

continued on page 66

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should avoid pesticides that have a history of causing slight phytotoxicity, reduced root growth or both. With or without visual symptoms of phytotoxicity some turfgrasses may be stunted by pesticides.

This can alter the turf canopy by making it more resistant to water loss. Turf leaves are less likely to expand into the upper boundary layer where air movement and water loss occurs more rapidly.

Thus, pesticides that reduce growth may also reduce water use. But the net result of reducing the need for irrigation may be negligible, especially where root systems are decreased.

Some chemicals are selective herbicides at one rate and plant growth regulators at another. Chlorflurenol is now used as a broadleaf herbicide, but was previously used as a plant growth regulator.

Plant growth regulators are used to reduce the need for mowing and to inhibit seed head development. Since they influence plant height and leaf extension rate, they also influence canopy resistance and transpiration rate.

A 30 percent reduction in turfgrass evapotranspiration has been reported with products such as EL-500, PP-333 and Embark. Some experimental PGRs have shown improved summer performance during periods of solid drought. It is possible that spring-applied PGRs cause a reduced growth rate that conserves soil moisture and also provides a better carbohydrate balance for summer growth.

Whatever the cause, PGRs offer a promising area of research to investigate turfgrass water conservation and improved summer performance. At this time, some caution should be used when water conservation is your main goal. It is likely that some PGRs will cause reduced root growth associated with less leaf growth. This may impair any drought avoidance mechanism inherent in a grass species. Also, some PGRs cause a flush of growth after the chemical wears off.

This additional growth may rapidly deplete stored soil water and negate any overall water conservation during the summer. It appears that PGRs which do not reduce root growth or cause a flush of growth may offer a means of water conservation.

—David Minner, University of Missouri

gation. That reduced the number of times irrigation was needed. Water application by this method is very similar to the standard recommendation: irrigate as deeply and infrequently as possible to promote an extensive root system.

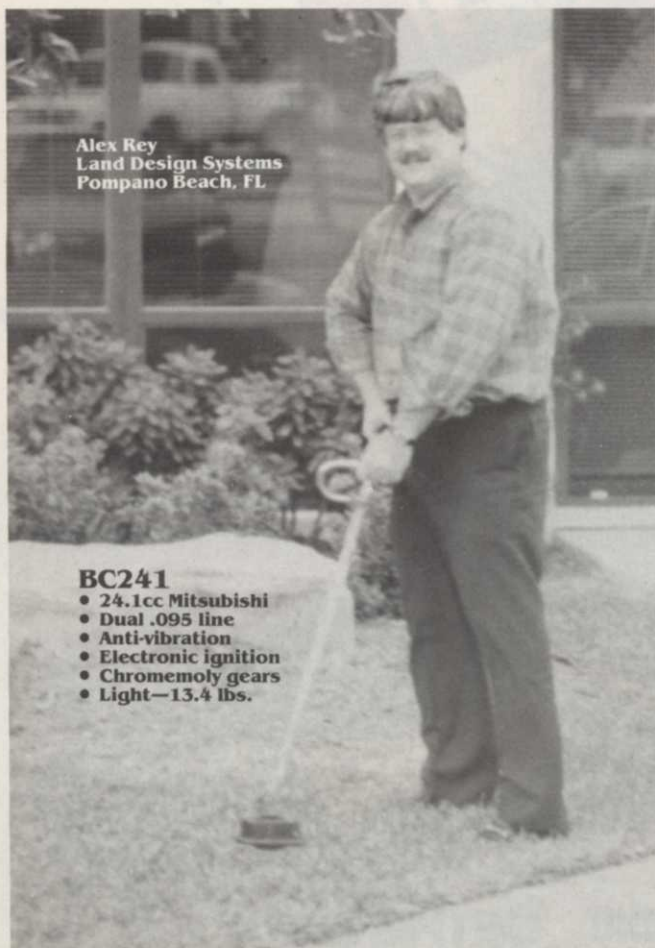
This recommendation is ambiguous, since it does not provide a basis for actual amount or frequency of water application.

The main purpose for irrigating deep (to the bottom of the effective root zone) and infrequently is to develop an extensive root system that continually expands into regions of available soil moisture. This prepares the plant to avoid soil drought.

The main disadvantage of irrigating too frequently has been cited as a shallow root system that becomes dependent on continued frequent irrigation.

Research in Colorado has indicated that turf appearance was best when water lost by ET was supplied by irrigation every two days. In fact, Kentucky bluegrass maintained an acceptable turf quality with 25 percent less water by irrigating every two days compared to 4.7 and 14 days.

This may sound like a contradiction
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tion to the accepted practice of deep and infrequent irrigation. But it instead should serve as a way to define what actual frequency of irrigation and amount of water are needed to provide a desired level of turf quality.

Another statement that often makes frequent irrigation unattractive as a possible water conservation technique is that WUR increases as irrigation frequency increases. This undisputed statement has been clearly documented by research.

These results have only observed water use as related to irrigation frequency rather than the water needed to provide the desired turf quality and function. Turfgrass managers should be more concerned with the amount of additional water that is needed by irrigation rather than the amount lost to the atmosphere. In many situations, turfgrass can perform quite well when water supplied by irrigation is less than the maximum WUR.

The advantages and disadvantages of irrigation frequency have been discussed. But no one fixed irrigation interval is better for plant growth or more efficient for water conservation than another.

Ideally, the interval between irrigation and amount of water applied at

each irrigation should be ever changing. ET rates, rooting depth and even turf function are dynamic and change on a monthly, weekly and daily basis.

In semi-arid regions of the country, very light rains may occasionally occur. These rains of only a few 100ths of an inch are not likely to make a significant change in soil moisture. Irrigating during or immediately after these light showers will add to the efficiency of a rain; the added irrigation will increase soil moisture.

Cloudy, cool conditions associated with occasional summer rains in semi-arid climates are also an efficient time to irrigate. At that time, the evaporative demand is lower than normal conditions which promote high ET.

Turf managers with labor intensive irrigation systems will have fewer options available for saving water by precise irrigation scheduling. Automatic systems programmed for site-specific irrigation can more efficiently play the odds of rainfall by irrigating more frequently with less water.

In addition to advanced irrigation systems, instruments and techniques exist that can help the turf manager interpret the need for irrigation.

Electronic moisture sensing devices, tensiometers, Class A pan

evaporation or combinations of these have been used to reduce water application by as much as 89 percent over conventional methods of scheduling irrigation.

Turfgrass managers should consult their local cooperative extension service and conduct on-site experimentation to determine if these techniques can help in water conservation programs.

Soil cultivation

Turfgrasses exposed to traffic often decline in growth because of soil compaction. Compacted soils are dense and poorly drained, resulting in less oxygen for root and shoot growth.

Reduced shoot and root growth are responsible for a lower water use rate. Soil coring and aerification will improve the quality of turf on compacted sites and also increase the water use rate. Even though core aerification increases water use, its advantages on compacted sites reduce the need for additional irrigation and enhance turfgrass drought avoidance.

Core cultivation should be avoided during hot, dry conditions. Excessive drying may increase the need for supplemental irrigation under these conditions.

LM

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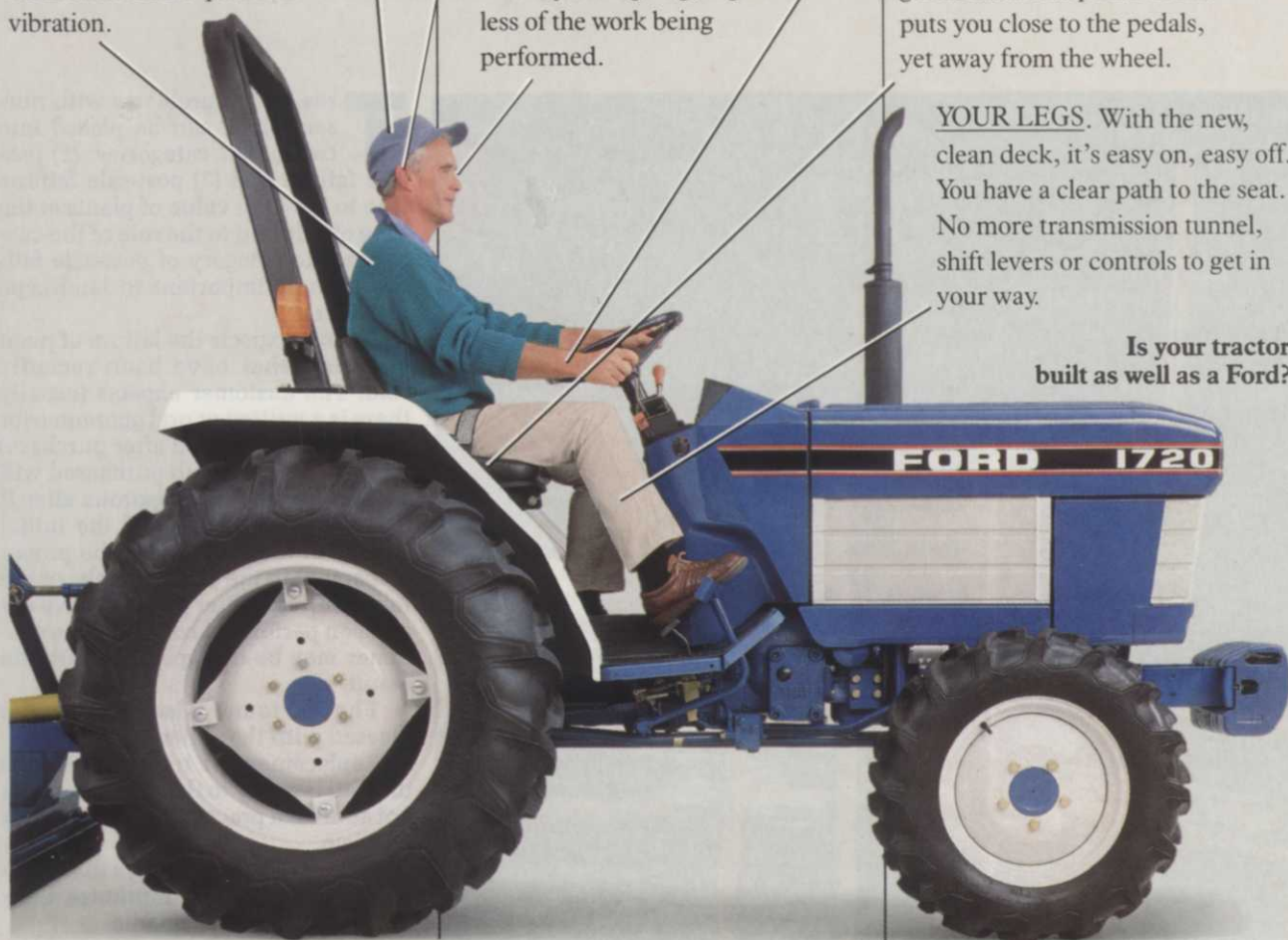
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MINIMIZING TREE AND SHRUB HEALTH PROBLEMS

In this age of valuable plant materials, the transplanting process must be done correctly. If it's not, the company stands to lose money.

by Terry A. Tattar, Ph.D., University of Massachusetts



Shown here is a properly planted shade tree. Note the wrap, staking and water well.

Tree health problems with nursery stock can be placed into two broad categories: (1) pre-sale failure and (2) post-sale failure. Due to the high value of plants at the time of sale and to the role of the customer, the category of post-sale failure is most important to landscape managers.

No one expects the failure of plant materials that have been recently sold. The customer expects (usually there is a written or oral guarantee for a specific time period after purchase) that the tree or shrub purchased will remain healthy and vigorous after it has been transplanted. If the initial quality of the sold plants, the proper placement in the planting hole, or the follow-up care after planting have not all been performed correctly, the customer may be disappointed with the result.

The customer also will not be pleased with the seller.

Replacement of trees and shrubs that fail is costly to the seller and does not address a practical solution to this problem.

Let's explore some ways that landscape managers can minimize their losses in recent transplants.

Placement in soil

The correct placement of the tree or shrub would seem to be a simple and straightforward matter with little chance for error. Unfortunately, it isn't.

The confusion is often caused by the uncertainty over exactly where the root system begins, due to wrapping and ties that are not properly removed during planting, and due to settling in the planting hold of large stock with heavy root balls. In addition to how a plant is set in a planting hole, the location and condition of the planting hole can often be sources of transplant failure.

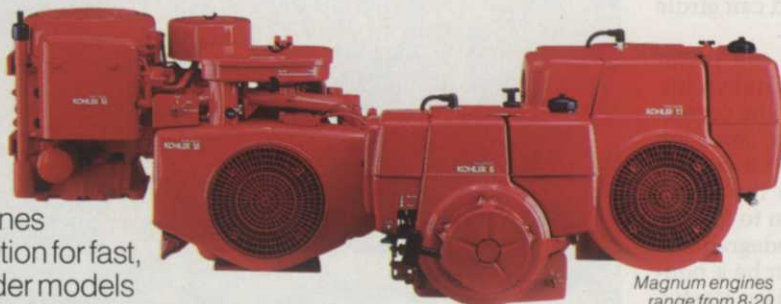
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Hemp cords left around a newly transplanted shrub will eventually cause stem girdling.

Determining the correct planting depth of each tree and shrub is a critical first step in proper placement. To do this, you must first untie all cords around the trunk and peel back all wrapping to examine the lower trunk and soil ball. Using the point where the trunk buttress forms at the root collar is the best location to aim for.

If you cannot see this point, begin digging carefully by hand around the soil ball until the major roots are found. Just above these is the buttress swell and the correct planting depth. Soil stains on the lower trunk can be misleading indicators of proper depth, as soil may have been mounded up during cultivation.

Wrapping and cords around the root ball are great for handling and storage, but become somewhat of a liability once a plant is set in the planting hole. Cords, regardless of type, do not biodegrade rapidly and can girdle or strangle the trunk.

Cord location around the lower trunk can also give the mistaken impression that it represents the correct planting level. Many times, cords are wound around the stem at a point a considerable distance up the trunk from where the roots begin to form.

Wrapping can be a biodegradable material like burlap or can be a non-biodegradable material like plastic, whether in a sheet or woven to look like burlap. Needless to say, non-biodegradable materials can cause a number of plant health problems if not removed at planting time.

Plastic wrap creates a low-oxygen/high-moisture condition that is ideal for microbial pathogens but not at all favorable for trees and shrubs. Plastic wrap is acceptable for transport and short-term storage, but often becomes

deadly when placed into the transplant hole. Plastic "burlap" is not as bad as plastic wrap, initially, since it is a mesh. However, plastic "burlap" will only expand to a limited extent as roots pass through it, resulting in root girdling at the edge of the root ball.

Examination of all layers of wrapping and removal of any non-biodegradable wraps is a must for proper planting.

The planting hole

The planting hole is a key factor in transplant survival. There is a general agreement that it should be at least twice the diameter of the root ball, but what about depth, backfill material and drainage?

A deep hole, improperly packed, will allow substantial settlement downward of a heavy root ball, and create an unhealthy deep planting condition.

Use of high quality loam to fill the transplant hole around the ball is

often a standard specification in landscaping contracts. However, much research on urban soils has shown that this practice often discourages the plant's roots from exploring soil outside the planting hole, and in the long run the tree or shrub becomes stunted or "pot-bound." Most urban soils are not similar to garden loam. Plants transplanted into them would adapt more successfully if parent soil were to be incorporated as much as possible into the backfill mix.

In addition, the resulting soil discontinuity can cause a "teacup" effect, where the soil around the tree is effectively isolated from soil moisture outside the planting hole. Surrounding soil can be wet, while the soil in the planting hole can be dry if soil texture inconsistencies exist around the planting hole.

Drainage out of the planting hole is crucial for essential aeration of the soil. Trees in poorly-draining holes usually die quickly from root suffoca-

continued on page 74



The author, Terry Tattar, installs wire mesh to protect a crabapple from chewing animal injury during winter.



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tion. Fill the planting hole with water and check how long it takes to empty.

If water remains overnight, downward or sideways drainage must be provided. Sometimes a clay hardpan exists beneath the planting hole that can be penetrated by digging a small hole. If this does not provide good drainage, a sideways French-drain can carry water away from the planting hole.

Once a tree has been set in the planting hole at the correct depth and backfilled, a water well is then constructed, and two to three inches of mulch is placed in it. Stakes or guys are installed to secure the tree and the trunk is wrapped to minimize chances of bark injury from sunscald. A final irrigation, and the tree or shrub is now properly planted. Or is it?

Follow-up care

If you feel that your work was done after the plant was set in the ground, you are overlooking a major cause of transplant failure: lack of post-planting follow-up. Post-planting problems fall into two general categories:

- continual care needed during transition to independent growth; and

- protection from biotic and abiotic stress.

The stakes, guys and cords around the trunk used to secure and protect the newly-planted tree can now strangle it if not loosened and eventually removed as the tree begins to grow.

Renew mulch if it begins to break down and allows excessive weed

Non-biodegradable materials can cause a number of plant health problems if not removed at planting time.

growth within it. Use only organic mulch or some material for mulch that allows both water and gas exchange between air and soil.

Avoid plastic sheeting which can suffocate roots.

Watering is needed when rainfall is inadequate to minimize moisture stress. Supplementary watering may be needed at any time during the entire period when the ground is not

frozen. Water wells should be leveled in the second growing season after planting to encourage roots to grow into soil outside the planting hole.

A newly-planted tree or shrub is vulnerable to many agents of destruction. Protection against chewing rodents (mice and rabbits are the most common) is often crucial for survival, especially in areas of high rodent populations.

Sometimes, the homeowners in their enthusiasm to "take good care of their plants" with extra tender-loving-care cause injuries. Too much watering or too much fertilizer, for example, can be just as bad or worse than none at all.

Injuries from lawn mowers and, more recently, string trimmers, needlessly kill and disfigure many young trees and shrubs.

Recommendations

A service to troubleshoot and manage health problems both before and after the guarantee period will decrease post-sale losses and provide an additional source of revenue. Many landscape operations already provide this type of maintenance service as part of their business. **LM**



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FEBRUARY 1988/LANDSCAPE MANAGEMENT 75

IT'S A JUNGLE OUT THERE

It's sometimes hard to understand insurance talk, since agents generally don't understand the green industry. But these tips from a well-known agent could make your next conversation more intelligible—and your next purchase more intelligent.

by James H. Leatzow

Talking to insurance brokers can be like coming to this planet from a different place and time. Their language is strange and unintelligible. Why is this so?

First, most insurance companies don't understand landscape contractors and aren't interested in learning about the green industry.

The insurance industry, for the most part, views a landscape contractor as something smaller than a small business, operating out of a garage, with a pick-up truck or two, and merely mowing lawns and planting bushes. They also think the pick-up truck is loaded with illegal aliens ready to tumble out the back gate at the first corner.

Obviously, this small and morally unstable group of contractors isn't worthy of the insurance industry's understanding because they don't develop sufficient premiums to justify any attention. It remains rather pathetic that this perverse and grossly inaccurate perception is the norm within the insurance industry, with only a few exceptions.

Well, folks, there's a glimmer of hope. Those handful of insurance companies that do have a more accurate understanding of landscape contracting will be the ones you want to build relationships with over time.

As with the recent stock market crash, the insurance industry will become difficult again. Then, you'll want to do business with those companies that understand you.

Dubious professionalism

The second problem confronting you is the rather dubious level of professionalism exhibited by so many insurance agents and brokers.

Here too it is imperative for you to find someone that truly understands your business and represents those



companies that are going to get the job done in the best possible fashion for you. From my perspective, the best test of whether an agent can meet your needs is found in the ease in which they communicate or solve problems for you, all in language you can understand.

All of this nonsense does not have to be confusing. There is no reason that simple insurance questions cannot be reduced to simple answers. If the answers are not intelligible, keep talking to your peers within the industry and find a specialist with whom you can communicate.

Once all of this is completed, the responsibility will fall upon you, the business owner. And you would be wise to grasp a more complete understanding of your insurance needs so that you can be in better position to improve your image.

This is critical to differentiate your firm from the "average" or less-than-acceptable-risk companies. Being viewed as a better than average contractor will produce reduced premiums, if you are able to maintain an acceptable (near loss-free) track record.

Workers' compensation

You have a great deal more control

over workman's compensation situations than you might guess. At a minimum, you should maintain workers' compensation coverage to cover job-related illness or injury to your employees.

Don't forget that a secretary running to the bank and being involved in an auto accident is job-related. Such claims are often more serious than routine cuts and scrapes.

Don't fall into the trap of considering all of your labor force as "independent contractors." That approach consistently does not hold water. You will be found responsible for their injuries if you provide them any benefits (tools, uniforms, rides to and from job sites, etc.) whether or not you maintain an actual insurance policy. If you do not now have an active safety program which, at a minimum, should include mandatory leather shoes, gloves, hearing protection on equipment, safety goggles, etc., you are not doing all you can do to reduce your potential for claims.

A good example of a way in which to reduce serious cuts from sharpening mower blades is to provide your employees with a pair of butcher gloves used in the meat cutting industry with palms of wire mesh to keep hands free of cuts.

Furthermore, annual classes on lifting techniques, done bi-lingually if necessary, will go great distances to reducing your workers' compensation claims.

Commercial auto

Your commercial auto policy is rather self-explanatory. Once again, make sure all of your vehicles, including trailers, are covered. At a minimum, make certain your insurance agent is maintaining and providing copies of your vehicle schedules, not just on the insurance policy endorsements.

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This should all be updated at the beginning, mid-point and end of season to make certain nothing is missing. You ought to consider fairly sizeable deductibles on your commercial autos so as to reduce premium. You don't need a \$100 deductible on any vehicle in your fleet. You ought to consider \$250 or \$500 at a minimum.

You also ought to be obtaining a motor vehicle report (MVR) from your insurance agent, at your cost, on each of your drivers at least once a year at the beginning of the season.

If you have drivers with tickets, accidents or liquor-related violations, you are putting your business at risk. Statistically, such drivers are more likely to have accidents. It doesn't matter if they got the tickets away from work. Those habits can mean sincere trouble for you and your business.

Commercial auto remains one of your largest exposures to a major law suit as a result of your employees. You cannot be too careful.

General liability

General liability remains one of the most important policies.

There is a tremendous amount of

confusion about coverages you ought to be carrying. First, you should make sure your agent has included comprehensive general liability to cover all operations that you may be involved in as a landscape contractor. If you do not have comprehensive coverage, certain tasks that you now do occasionally (such as trimming branches) may not be insured.

The comprehensive portion provides coverage for anything that you do as long as it is within the scope of tasks typical to a landscape contractor. The comprehensive general endorsement is normally provided free. It therefore makes no sense not to carry it.

Existing liability

The next critical area covers your existing liability portion. You ought to open your policy to the liability portion and look for Code No. 07311. An X, C or U after the Code No. 07311 means that explosion, collapse and underground are excluded from coverage. There must be a charge showing the deletion of these exclusions in order for these coverages to apply. Unfortunately, many agents do not even understand this. You can forego explosion and collapse, but

every landscape contractor should carry underground liability coverage.

Fiber optics are being installed all across the United States. Unlike phone lines, fiber optics cannot be spliced. If you cut a fiber optic cable, the average cost to repair the damage from junction box to junction box, often a half-mile apart, will be about \$50,000.

If your present policy shows the "U" after the code number, you have no coverage for such a claim. If you hire a trenching firm to work for you and they do not carry underground liability, you will be responsible whether you carry the coverage or not. Once again: do not put a shovel in the ground unless you have underground liability and it is verified by your agent in writing.

Do not hesitate to accept a \$500 or \$1,000 deductible for underground if it will mean a rate reduction. Once underground claims begin coming in from the fiber optics mishaps, this important coverage will undoubtedly get more expensive than it now is. You should be calling "Julie" for every project to be staked prior to setting foot on the project.

If a claim does occur, make certain you photograph the actual damage

continued on page 80



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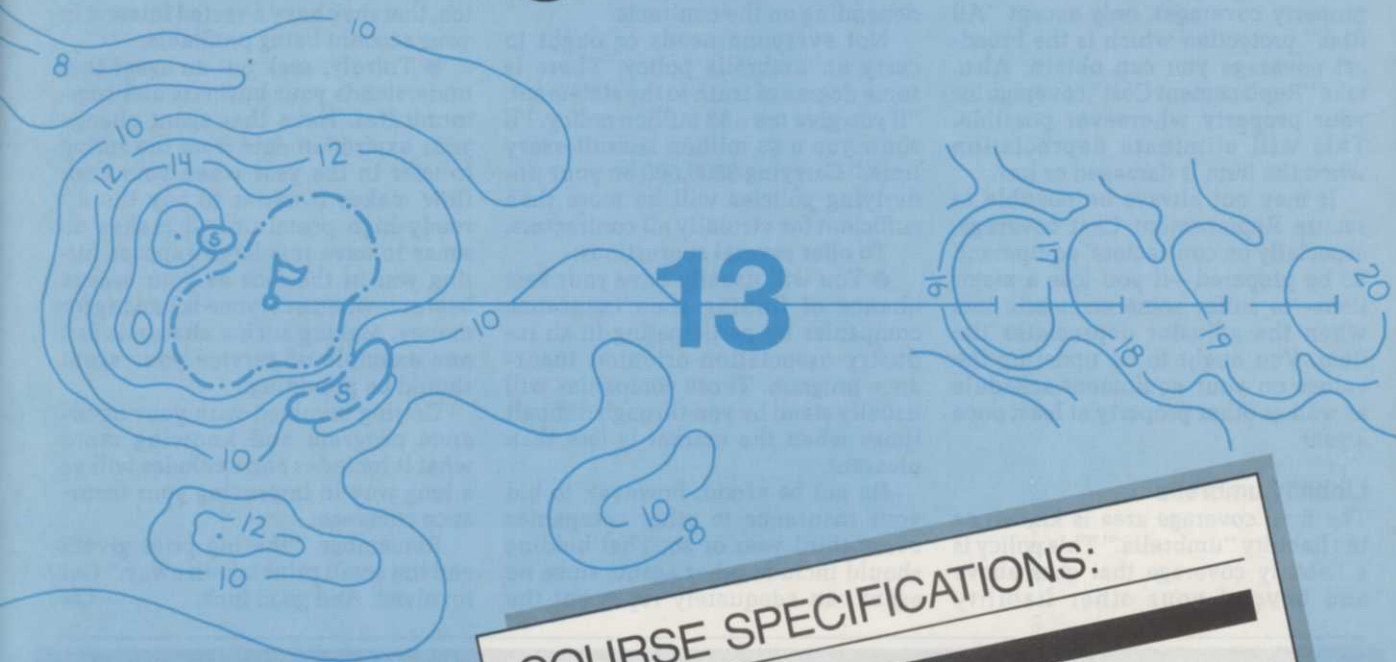
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and document the names of the utility company people that visit the accident site. If they mis-marked the site, it is possible to fight the claim. But only if you have documentation.

Property

Property coverage should include not only your office contents but your contracting equipment too. In any property coverages, only accept "All Risk" protection which is the broadest coverage you can obtain. Also, take "Replacement Cost" coverage for your property wherever possible. This will eliminate depreciation when the item is damaged or lost.

It may not always be possible to secure Replacement Cost coverage, especially on contractors' equipment. So be prepared—if you lose a major item—to suffer some economic loss when the adjuster depreciates the item. You ought to be updating the values on your equipment schedule as well as other property at least once a year.

Liability umbrella

The final coverage area is known as the liability "umbrella." This policy is a liability coverage that goes above and beyond your other liability

exposures.

Since the rates for this coverage have skyrocketed in the last few years, you might consider taking a minimum of \$1 million or even going without, if the cost is too high. Your contracts will demand that you carry higher limits at times, and you typically will be required to purchase one or increase your present policy, depending on the contracts.

Not everyone needs or ought to carry an umbrella policy. There is some degree of truth to the statement, "if you give me a \$3 million policy, I'll show you a \$3 million lawsuit every time." Carrying \$600,000 on your underlying policies will be more than sufficient for virtually all contractors.

To offer several suggestions:

● You will usually have your best chance of finding good insurance companies by participating in an industry association-oriented insurance program. Those companies will usually stand by you through difficult times when the market is less than pleasant.

Do not be afraid, however, to bid your insurance to other companies every third year or so. That bidding should include other agents since no agent can adequately represent the

entire marketplace.

Furthermore, such bidding forces your agent to remain competitive and on top of your account. Traditionally, competition should only make a good agent look better.

● Next, demand that your insurance company provide loss control services to help you reduce exposures and potential claims. Remind them, too, that they have a vested interest in your account being profitable.

● Thirdly, seek out an agent that understands your business and communicates. Have that agent change your expiration date from the spring to later in the year when your cash flow makes it easier to pay the already-high premiums. It makes no sense to have this large expense hitting you in the face as your season begins—when everyone is looking for money. Making such a change is just one example of service your agent should be providing.

Getting involved with your insurance program and knowing more what it includes and excludes will go a long way in improving your insurance coverage.

Remember, "the big print giveth and the small print taketh away." Get involved. And good luck. **LM**

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Circle No. 128 on Reader Inquiry Card

HOW FAST IS TOO FAST?

Yes, you can grow too fast. As a matter of fact, you might be growing too fast right now. Here are some questions you can answer to tell you exactly how fast you're growing.

by Rudd McGary and Ed Wandtke

There is an excitement about having a growing company. That's one of the reasons why many owners point toward growth.

But there are also times when a company should look at consolidating its current position so that the growth to that point is solidified. At times growth—particularly if measured only by revenue—is not the best strategy for a company. The notion that increasing revenue will increase profitability traps many growth companies that fail to look at measurements necessary to ensure profitable growth.

As growth continues, many issues are important to address. Some of the issues are cost-related but are often overlooked due to the company's rapid growth and profitability. Here are some keys:

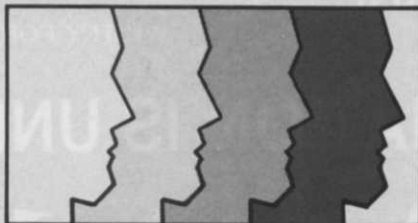
1. Should you consider growth in profitability as an objective before growth in total revenue? Companies exist to make money, profits. Failure to do so will result in the company going under. For entrepreneurial types, the focus on accountability is not as exciting as growth in revenue. But determining ways that a company can be made more profitable at its current size is more than an exercise...it's a necessity.

We believe that a company should be profitable at any size, with the possible exception of the first year when start-up costs are incurred. Looking at profitability and determining ways to add profits is one way to look at growth.

2. Could any under-used assets add to the company's growth without adding costs? You can look at this question from two vantage points.

First, do you have vehicles or equipment that could be better used to increase sales? Companies sometimes buy an extra vehicle as a sort of insurance policy against down time, but at the same time they might be able to use the same piece produc-

MANAGEMENT



IN BUSINESS

tively. The same is true with certain pieces of equipment. Companies buy new types of equipment for specific jobs and then find that they have equipment standing around during part of the year.

Second, are your personnel productive enough? If you have a lawn care company and each of your applicators is doing \$60,000 per year, you have a lot of potential in revenue from these people. This under-use should be evaluated as much as the equipment and vehicles.

3. Do you have enough management talent to grow? This is often overlooked. The management talent needed to get you to your current size may not be the same type needed for your next growth objectives. This is particularly true in smaller companies, although it extends to larger companies as well.

Who will become managers in the organization? Do you have people internally whom you can promote? Do you have specialists in different areas who can manage them? These and other management questions aren't asked often enough. Generating the revenue for growth is possible—managing the growth is another question.

4. What is the cost, from a marketplace point of view, of growth in your marketplace? As your company grows, it will face more severe competition unless you are fortunate enough to be the only company in your area doing what you do. This is rarely the case. The more severe the competition, the more costly the marketing.

Costs increase in advertising, per-

sonal sales efforts, promotion and/or management time. You need to be aware of these when determining your desired rate of growth. You may find that projected growth will, in fact, be too costly for you. That means you must rethink your growth objectives.

5. Finally, what financial needs will you have in order to grow? Will you need equipment, personnel, vehicles, operating space? All of these resources will have costs attached to them. How will you fund these? Can they be funded out of retained earnings, will you need to give up equity to raise cash, or will you borrow to finance them? These are the first questions to ask.

Then you need to know, particularly if you have chosen debt funding, whether or not you will be able to fund the debt that you incur. You need to be certain (or, at least as certain as you can be) that the money you spend will indeed attract new business. If you can't be certain of a growth in customers, you shouldn't be spending money simply because you have a "feeling" about the future.

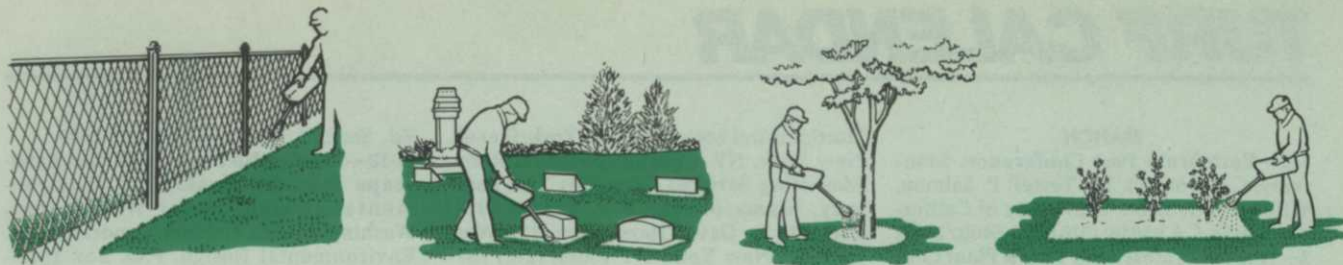
Summary

If you want to grow—and most companies do—you should look at the reality of your present position:

Are there areas that can be more productive without adding additional costs? Does the marketplace really offer the potential for growth that you want? What is the competition likely to do, and what will this cost you? Do you have the management capacity to grow or will you have to either promote or go outside the organization to ensure profitable growth? Is this the year when you should consolidate past gains and wait until next year for major expansion? And, finally, can you afford to grow?

All of these questions show that you need to do a lot of planning before you go through major growth. With this planning, and assuming that the marketplace offers true opportunities for growth, you can grow. Without asking—and answering—these questions, you may be growing too fast. It is a risk that all companies must face. **LM**

Wandtke and McGary are senior consultants with All-Green Management Associates in Columbus, Ohio. Dr. McGary focuses on marketing and management issues. Wandtke focuses on operations and financial questions.



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TURF CALENDAR

MARCH

1-3—**Vertebrate Pest Conference.** Monterey, CA. Contact: Dr. Terrell P. Salmon, Wildlife Extension, University of California, Davis, CA 95616; (916) 752-6409/2536.

2—**Annual Professional Turf & Plant Conference.** Nassau Suffolk Landscape Gardeners Association, Nassau Veterans Memorial Coliseum, Uniondale, NY. Contact: Pat Voges, Orinoco Dr., Brightwaters, NY 11718; (516) 665-2250.

2-3—**Michigan Forestry and Parks Association Annual Winter Conference.** Michigan State University, East Lansing, MI. Contact: Myrtle Jones, Life Long Education, Kellogg Center, Michigan State University, East Lansing, MI 48824-1022; (517) 353-9407 or Dan Veresh, Dow Gardens, 1018 W. Main St., Midland, MI 48640; (517) 631-2677.

4—**ASTM Symposium on Vertebrate Pest Control and Management Materials.** Sheraton Hotel, Monterey, CA. Contact: Dr. William Jackson, Environmental Studies Center, Bowling Green State University, Bowling Green, OH 43403.

4-5—**South Florida Landscape Trade Show.** Miami Expo Center, Miami, FL. Contact: Charlye Roberts, Florida Nurserymen & Growers Association, Dade County Chapter, 19160 N. Krome Ave., Miami, FL 33187; (305) 232-2035.

5-13—**1988 New York Flower Show.** The

Horticultural Society of New York, Pier 90, New York, NY. Contact: David Jacobson, Marketing Services Corp., 811 The Parkway, Mamaroneck, N.Y. 10543; (914) 698-1417 or David Harrington, 128 West 58th St., New York, NY 10019; (212) 757-0915.

6-10—**1988 Canadian Turfgrass Conference.** Harbour Castle Westin Hotel, Toronto, Ontario, Canada. Contact: Mary Gurney, Canadian Golf Course Superintendents, Weston, Ontario M9N 1X3; (416) 249-7304.

9—**Sports Turf Conference.** Sports Turf Association-Canada, Hilton Harbour Castle Hotel, Toronto, Canada. Contact: Annette Anderson, Horticulture Department, University of Guelph, Guelph, Ontario, Canada N1G 2W1; (519) 824-4120 ext. 2597.

9-10—**GreenShow '88.** Del Mar Race Track, San Diego, CA. Contact: Andy Mauro, GreenShow '88, Del Mar Fairgrounds, Del Mar, CA 92024; (619) 755-1161.

9-11—**Fire Protection for Safety Professionals.** Long Grove, IL. Contact: Robert Adamski, National Loss Control Service Corporation, Long Grove, IL 60049; (800) 323-9585 or (312) 540-2400.

10—**Commercial Landscape Maintenance Short Course.** Agricultural Center Auditorium, Sanford, FL. Contact: Uday Yadav, Agricultural Center, 250 W. County Home

Rd., Sanford, FL 32773; (305) 323-2500.

11-12—**Leaving No Stone Unturned Landscape Industry Conference.** Environmental Design, Hotel Washington, Washington, DC. Contact: Sandra Lerner, Environmental Design, P.O. Box 15121, Chevy Chase, MD 20815; (301) 652-1212.

12-15—**Mid-Year Educational Conference, Buildings/Grounds Subsidiary.** Environmental Management Association, Twin Bridges Marriott, Arlington, VA. Contact: Jean M. Day, 1019 Highland Ave., Largo, FL 34640; (813) 586-5710.

15—**Association for use of Native Vegetation in Landscapes (ANVIL) Technical Conference.** Kishwawkeg College, Malta, IL. Contact: Jim Safron, McGinty Bros., 3524 Long Grove Rd., Long Grove, IL 60047; (312) 438-5161.

20-22—**Midwest Aquatic Plant Management Society.** Marriott Hotel, Columbus, OH. Contact: Robert Johnson, MAPMS, P.O. Box 100, Seymour, IN 47274.

22-23—**West Virginia Vegetation Management Association Meeting.** Marriott, Charleston, WV. Contact: Richard Johnstone, Delmarva Power Co., Box 1739, Salisbury, MD 21801; (301) 546-6331.

27-31—**Annual Meeting, American Society of Golf Course Architects.** Princess Hotel, Hamilton, Bermuda. Contact: Paul Fuller, 221 N. Lasalle St., Suite 3900, Chicago, IL 60601; (312) 372-7090.



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LANDSCAPE MANAGER OF THE YEAR

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1987 Landscape Manager of the year
Michael Hugg

Entry forms are now being accepted by the Professional Grounds Management Society and Landscape Management magazine for their second annual "Landscape Manager of the Year" award.

Purpose of the award is to recognize superior job performance among landscape managers, to challenge those involved in the industry to achieve higher standards of excellence, and to bring national recognition to deserving managers.

Any person directly responsible for the professional maintenance of one or more landscapes is eligible to enter. Applicants will be judged according to job performance, honors and awards, procedures and philosophies, and contributions to the green industry. Applicants will be asked, at the time of entry, to submit four 5 x 7 black-and-white glossy photos and 10 color 35mm slides of current work areas with a short narrative on each.

(clip and mail)

Applicant's name

Title

Applicant's company

Official entry form should be sent to:

Name

Title

Company

Address

City/State

Zip Code

Mail to: PGMS, Landscape Manager of the Year, 1201 Galloway Ave., Suite 1E, Cockeysville, MD 21030

PROBLEM MANAGEMENT

by Balakrishna Rao, Ph.D.

Iron for turf

Problem: Is there any real advantage in using iron on turfgrass? If so, what would be the proper timing and amounts? (Pennsylvania)

Solution: Depending upon the soil properties, turfgrass species and geographic locations, there may be some advantage in using iron on turfgrass. Reports indicate that iron can improve the color and can possibly reduce the need for using high rates of nitrogen. There are a number of iron-containing products on the market. The product literature may suggest using iron three to four times a year to get maximum benefit.

Unpublished reports suggest that the results obtained from iron-containing products are quite variable. Some have had more success than others. Non-chelated iron products appear to be better than the chelated products. We have not seen any appreciable color difference over untreated Kentucky blue, rye and fescue mix turfgrass using several iron products on the market, even after applying four times a year. Some iron sources can be phytotoxic and a few can stain non-targeted areas.

So, as far as your question concerning "real advantages," the best thing to do is to try different products on a small scale in your area. Read and follow label specifications for details on rates, etc.

Soil compaction and trees

Problem: Older trees on the town commons are suffering from years of soil compaction. How can we help these trees recover? (Massachusetts)

Solution: Soil compaction is one of the major problems in heavy traffic areas like school grounds. There are only a few things that can be done to relieve compaction.

Where practical, try to correct compaction with hydraulic pressure. Soil-injecting root-feeding tools can be used. The key is to get the water pressure deep into the root zone to break the compacted soil. In most situations, the active roots of plants will be in the top 18 to 24 inches.

Another approach is to drill vertical holes in the ground using a soil auger and filling them with loose amendments like mulch or peat moss. If poor drainage appears to be a problem, filling these holes with pea gravel would be useful.

The most ideal way to handle these problems is to recognize the potential for compaction from traffic or construction, fill damage, etc. prior to its happening. Then, start providing corrective measures and treatments before the anticipated compaction occurs.

In situations dealing with fills or construction, installing dry wells around valuable trees is beneficial. Make sure to allow enough room for the tree trunk to grow. For the problems you are currently experiencing, apply water pressure using root-feeding injecting needles and/or the auger drilling method for the most practical solution. If prac-

tical, use a mulch over heavily-trafficked areas to minimize compaction.

Needle-dropping spruces

Problem: Spruce plants in our area are showing severe dieback and needle drop from lower branches. The problem appears to be progressing from the lower branches upwards. We thought that it might be *Cytospora* canker, but there is no bluish white pitching. We sprayed for mites and spruce gall aphids without much luck with this needle problem. Any idea what this problem might be and how do we manage it? (Pennsylvania)

Solution: Based on your description of the symptoms, the problem appears to be most likely related to fungal disease. Probably it is not *Cytospora* because you have not seen the bluish white resinous pitching on the trunk or branches which is typical of *Cytospora* canker disease.

Needlecast fungal disease caused by *Rhizosphaera kalkhoffii* appears to be the next best possibility. This disease is known to progress from the lower branches upward. Infected two-year-old needles drop usually in the second summer. Current-year needles may become infected in May/June months but symptoms don't occur until fall or next spring. At this time, the fungus produces small black fruiting bodies on the surface of needles—almost in a row—near the stomata. Healthy needles will have whitish stomatal opening. Infected two-year-old needles turn yellow in July and then change to purple by late August-early September and finally drop by late summer or fall.

Check the needles periodically for fruiting bodies of this fungus. Plant disease-free trees. Send in fresh representative samples to your county extension agents and verify the possibility of *Rhizosphaera kalkhoffii* before using fungicides. Application of benomyl, Daconil or Bordeaux mixtures when new growth begins or around early June and repeated again in late June is recommended to manage this disease. Continue the pest management you were providing thus far. Fertilization and watering as needed will improve plant vitality and maintains plant health.



Balakrishna Rao is Director of Lawn Care Technical Resources for The Davey Tree Co., Kent, Ohio.

Questions should be mailed to Problem Management, Landscape Management, 7500 Old Oak Boulevard, Cleveland, OH 44130. Please allow 2-3 months for an answer to appear in the magazine.

Offensive advertising

To the editors:

I am a landscape contractor in Richmond, Va. and I also ride a Harley-Davidson motorcycle. I found the Scotts Pro-Turf advertisement printed in LANDSCAPE MANAGEMENT magazine (November 1987, page 28) to be discriminatory towards those of us who ride motorcycles. I do not feel that "the average person" considers a motorcycle rider "Big Trouble." This negative and prejudiced depiction of motorcyclists is unnecessary and harmful to all motorcycle riders.

Many motorcycle organizations contribute to charities, hold toy runs for children's hospitals, and are trying to change the public view that has been partially created through advertising such as this.

David Wilson

Shipp & Wilson Landscaping
Glen Allen, Va.

Where are the people?

To the editors:

I enjoyed your November "Outlook" column (Where are the people?). You probably opened some eyes to the problems facing the industry vis-a-vis future leadership.

Richard W. Lambert
The Idea Bank
Tempe, Az.

Cool suits for hot work

To the editors:

As a long-time subscriber to your magazine, I particularly enjoy the columns in which questions and inquiries are posed by your readers and responses provided by the staff. I am reasonably sure the sales and manufacturing community likewise takes great interest in these columns. I would like to pose a challenge to equipment manufacturers on behalf of the many thousands of people employed in our kind of work.

I am the parks director in the mid-Atlantic community of Hampton, Va. Among our many responsibilities is turf maintenance of all highway rights-of-ways, median strips, vacant lots, school grounds, parks, public buildings and so on. Our weather in June, July, August and September gets very hot and miserably humid. The fatigue factor affects our employees tremendously under these conditions.

In the past year, stock car drivers

on the Winston Cup circuit have taken to wearing what they refer to as "cool suits" and helmets. These are freon-charged and operate via hook-ups to a small compressor and electric motor. Recently I read where the average cost per suit is about \$2,800 and helmets run in the vicinity of \$400-\$600.

Why wouldn't it be possible for cool suits to be manufactured for use by landscape employees? A conservative estimate of the number of tractor operators or riding mower operators employed by highway departments, cities and parks departments, golf courses and so on would probably be in the 50,000 to 100,000 range, not to mention private companies. Given the economics of scale, it would seem likely to me the manufacturers of such wearing apparel could bring the price down into the range which could be considered by this industry as an item of clothing which could be place on the employees to improve productivity, morale, employee health, etc. In the case of tractors and riding mowers, it would seem the necessary attachments for access to elec-

tricity and on-board compressors could become an optional or standard item.

In the interest of the landscape employee of the present and future, I would request the industry take serious consideration to the suggestion.

Thomas H. Daniel

City of Hampton
Hampton, Va.

Wringo

To the editor:

Thanks for the press given to me in your September issue.

The 15 years of service for which I was given a plaque at the Lawn Seed Division meeting during the annual convention of the American Seed Trade Association was as secretary-treasurer of The Lawn Institute. It was not as the Lawn Seed Division's secretary-treasurer, as reported.

Robert A. Russell

J&L Adikes, Inc.
Jamaica, N.Y.

Oops! Our apologies.—Ed.

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PRODUCTS

Perennial ryegrass gets PVP certificate

Pickseed West recently announced that the USDA Plant Variety Protection Office has issued a PVP certificate for Fiesta II perennial ryegrass. The application was processed and protection granted for Fiesta II in record time.

According to Pickseed's Jerry Pepin, Ph.D., Fiesta II represents the latest and best efforts in variety development to date. It is a dark green col-

ored, fine-leaved variety that has a lower and slower growth habit than most perennial ryegrasses and is less stemmy in the spring.

It has excellent heat tolerance and summer performance.

Circle No. 197 on Reader Inquiry Card

'Bandage'-type wrap protects young trees

Guard-Tex Tree-Wrap provides excellent protection for newly-planted trees

and bushes from the elements, dogs, rabbits, mice and other gnawing animals, according to its manufacturer.

Easy to apply, self-adhesive Tree-Wrap protects tender bark against splitting, sun scald and freezing temperatures while allowing the bark to breathe, General Bandages says. Tree-Wrap is also easy to remove, and because it sticks only to itself, it will not strip tender bark or leave a gummy residue.

Landscape managers and nurserymen can also use Tree-Wrap for grafting operations, staking tomatoes and training vining vegetables, roses, espaliered trees and shrubs.

The Ultimate, All-In-One Landscape Implement!

The unique, new Dakota Hand is designed to be a do-anything, go-anywhere landscape tool.



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Options include water pumps, hydraulic pumps, jack hammers, hydraulic power packs, and much more.

The Dakota Hand is made specifically for resorts, golf courses, apartment complexes, hobby farms, parks, nurseries, municipal and state facilities, and for rentals, landscapers or soil conservation.



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Patent #46256621

Product Demonstration Available on Video



Circle No. 198 on Reader Inquiry Card

Pesticide add-in eliminates odors

One pint of Mask-It in 1,000 gallons of spray mix converts a pesticide odor into a pleasant fragrance.

An unpleasant odor is translated in the public's mind to be toxic vapors of hazardous chemicals, Rockland Chemical Co. claims. No longer do the majority of lawn care clients believe that the pesticide's efficacy is proportionate to its odor, says Rockland. They are more concerned about possible health hazards and neighborhood annoyance, the company adds.

Mask-It helps solve all of these consumer concerns by eliminating the unpleasant odor associated with pesticide applications.

Circle No. 199 on Reader Inquiry Card

Granular herbicide now labelled for ornamentals

A new long-lasting granular weed

Circle No. 138 on Reader Inquiry Card

control product containing Surflan is now available for ornamentals.

XL, from Elanco Products, is registered for use on container-grown ornamentals, landscape ornamentals and ground covers.

XL is widely used as a pre-emergence herbicide in warm-season turf for control of most annual grasses and certain broadleaf weeds. When used on ornamentals, XL controls a broad spectrum of weeds for up to eight months, depending on rate.

XL is surface-applied over established plantings, requiring only rainfall or irrigation to move the herbicide into the soil. One- to two-inch cultivation will not reduce its effectiveness.

Circle No. 200 on Reader Inquiry Card

Computer provides tree management help

A group of information-related services, including computer training, is being offered by ACRT, Inc.

The "Tree Manager" package includes tree inventory, a management plan, computer software and software installation, training and support. This management information system ensures the most dangerous tree situations are attended to first. Then, all trees are placed on a routine schedule which can be budgeted on a yearly basis.

Tree Manager software generates listings of sites and trees that meet a user-specified condition, listings of inspections to be completed, work orders and summary reports.

Circle No. 201 on Reader Inquiry Card

Interlocking pavers cut down on maintenance

Extreme temperatures won't hurt Uni Interlocking Concrete Paving Stones. Attractive and durable, the pavers fit into residential or commercial landscapes. The paving stones are available in a variety of shapes or colors. They are maintenance-free and can be easily removed for changes in the

landscape or underground repairs.

Circle No. 202 on Reader Inquiry Card

Fine particle fertilizer has pre-emergence action

O.M. Scott & Sons now has an all-soluble, fertilizer-based pendimethalin product 20-5-5 Fertilizer Plus Pre-Emergent Weed Control at a low price.

While maintaining good spreadability, this new formulation contains about four times more parti-

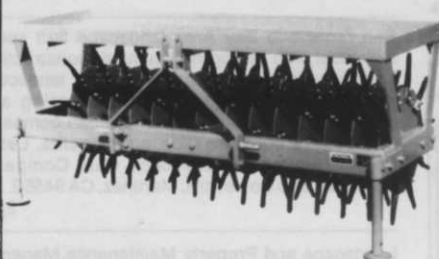
cles per square inch than typical blends to greatly enhance coverage and pre-emergence control performance, the company says.

Applied within the flexible rate range stated on the label, the new Scotts product delivers 1.5 lbs. of pendimethalin per acre at 0.8 lbs. of nitrogen per 1,000 sq. ft. This allows users to apply higher rates of active ingredient in areas of heavy weed pressure, without applying too much nitrogen at the same time.

Circle No. 203 on Reader Inquiry Card

Hahn has an Aerifier® to fit your Tractor... and your Budget.

For fast, easy and economical aerification... and they're practically maintenance free.



TM-140

Aerifies a 6 ft. swath using your tractor's 3-point hitch. Holds 140 "open" or "closed" style tines. Half-ton weight rack is standard.



TB-140

The 6 ft. tow-type has same features as TM-140, plus hydraulically operated transport wheels. Can use your tractor's hydraulics or optional hydraulic hand pump.



TM-60

Only 34 inches wide and they aerify a full 32 inch swath with 60 "open" or "closed" tines.

The TM-60 attaches to the 3-point hitch of a category "0" or "1" tractor. The TB-60 tow-type unit can be used with any tractor equipped with hydraulics. A hydraulic hand pump is available to provide self-contained powered lift.



TB-60

For more information, call

800/457-4246

In Indiana, call 812/428-2020 collect

Hahn

1625 N. Garvin St., Evansville, IN 47711

Circle No. 124 on Reader Inquiry Card

FEBRUARY 1988/LANDSCAPE MANAGEMENT 91

CLASSIFIEDS

RATES: \$1.10 per word (minimum charge, \$25). Bold face words or words in all capital letters charged at \$1.35 per word. Boxed or display ads: \$90 per column inch-1x (one inch minimum); \$85-3x; \$80-6x; \$75-9x; \$70-12x. Agency commissions will be given only when camera-ready art is provided by agency. For ads using blind box number, add \$10 to total cost of ad. Send ad copy with payment to Dawn Nilsen, LANDSCAPE MANAGEMENT, 1 East First Street, Duluth, MN 55802 or call 218-723-9200.

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WANT TO BUY OR SELL a golf course? Exclusively golf course transactions and appraisals. Ask for our catalog. McKay Golf and Country Club Properties, 15485 N. East Street, Lansing, Michigan 48906. Phone (517) 484-7726. TF

LEARN Professional Landscaping and Gardening at home. Accredited program provides thorough training in all phases of commercial and residential landscaping. Certificate awarded. Free booklet describes program and opportunities in detail. Lifetime Career Schools, Dept. A-290, 2251 Barry Avenue, Los Angeles, California 90064. 2/88

LANDSCAPING & IRRIGATION. 18 yr. established business in N.E. Michigan. \$150 K gross. Buildings, equipment, land, contracts and inventory: \$120,000. Inquire: Mr. George Morrow, 6544 Mt. Maria Rd., Hubbard Lake, Mich. 49747 (517) 727-2085. 2/88

HELP WANTED

LANDSCAPE MAINTENANCE SUPERVISOR: Scapes, Inc., a commercial landscape firm in Atlanta, Georgia, is seeking an individual who has strong management skills, as well as, extensive landscaping experience and knowledge of plants. Advancement potential — up to Division Manager — makes this position ideal for a goal oriented individual. 404-956-7500. TF

LAWN CARE PROFESSIONAL: Commercial landscape firm looking for responsible person to start up lawn care division. Responsibilities to include applications, service calls, record keeping, training and inventory. Prefer B.S. in Agronomy or at least 2 years field experience. Generous wage & benefits package. Send resume to Hunt & Hulteen, Inc., 50 Spark Street, Brockton, MA 02402. (1-617-580-1062). 3/88

MANAGEMENT TRAINEE: Tampa area commercial landscape management firm has opening for person with horticulture degree. Must have knowledge of Florida plants and have the ability to communicate. Initial responsibilities include horticultural quality control and customer service. No experience required. Positive professional attitude and willingness to learn a must. Call Mr. Blanchard 813-854-2383. 2/88

The Chicago area Toro distributor is seeking a sales person for residential and commercial turf irrigation. Experience in irrigation design, product application assistance, field service support and project quotations is preferred. Company training and support available. Direct customer involvement also includes training schools and trade association activities. If you have a track record in industrial sales and the landscape industry, please contact Ron Jones, CTL, 911 Hilltop Drive, Itasca, IL 60143. 2/88

San Francisco Bay Area landscape firm seeks individual with strong horticultural, construction, irrigation, and client relation skills for landscape installation foreman position. Learning and growth opportunities with established company. Competitive compensation and benefits. Letter and/or resume to Landscape Care Company, 4026 Pacheco Boulevard, Martinez, CA 94552. 3/88

Landscape and Property Maintenance Manager. A rapidly expanding Southern Vermont landscape firm is seeking an experienced, organized working manager. We are looking for someone with good landscape skills and a basic knowledge of the building trades to oversee the complete maintenance of the second homes of our residential customers. This is a year round position in a rapidly growing area for a person with good common sense, the right skills and personality. Please reply by mail to: Homestead Landscaping Co., P.O. Box 125, Bondville, VT 05340-0125. 2/88

NURSERY MANAGER: Leading Kansas City landscape company has immediate opening for talented, experienced and aggressive person to manage our nursery and rewholesaling operation. Excellent growth opportunity. Experience in sales, purchasing, inventory control, and personnel required. B.S. in horticulture or related field preferred. Salary incentive, benefits. Send resume with experience and salary history to: Hermes Company, P.O. Box 14336, Lenexa, KS 66215. 913-888-2413. 2/88

LANDSCAPE/SALES: Chapel Valley Landscape Company, a leading commercial landscape company in the Baltimore/Washington, DC Metropolitan area, is offering a career opportunity for a Landscape/Sales professional. The individual we seek will be aggressive, self motivated, and responsible. If you are looking for a challenge and an opportunity for growth and have a college education or a proven track record: Chrissy Fritz/Recruiting Assistant, CHAPEL VALLEY LANDSCAPE COMPANY, Post Office Box 159, Woodbine, Maryland 21797. (301) 924-5400. An Equal Opportunity Employer. 2/88

LANDSCAPE DESIGN & SALES: Leading Kansas City landscape company has immediate opening for talented, experienced and aggressive person in residential and light commercial design and sales. A.S. or B.S. in horticulture or related field preferred. Salary incentive, benefits. Send resume with experience and salary history to: Hermes Company, P.O. Box 14336, Lenexa, KS 66215. 913-888-2413. 3/88

LANDSCAPE FOREMAN - Year round with a quality company located on the coast of MAINE. Experience managing construction and planting crews. Generous benefit package for qualified candidate. Send resume with work experience and salary history to: EARTHWORKS/MATTESON, LANDSCAPE AND TREE EXPERTS, P.O. Box 31, Yarmouth, ME 04096. 3/88

LONGWOOD GARDENS, INC., BOX 501, KENNETT SQUARE, PA 19348-0501. POSITION OPENING - POSITION: LANDSCAPE SUPERINTENDENT (Outdoor Division of Horticulture). **DEPARTMENT:** HORTICULTURE. **RESPONSIBILITIES:** The person in this position is responsible for overall leadership in outdoor horticulture operations at Longwood. Included in the 1,050 acres of property are 350 acres under cultivation and open to the public. The remaining 700 acres consist of farmland, woodland, grassland, and waterways requiring less intensive maintenance. The management responsibilities of this position involve planning, scheduling and coordinating all outdoor work operations, and the overall supervision and personnel management of 40 employees. The installation of new displays and revitalization of existing landscape features are also primary responsibilities. The Landscape Superintendent works closely with everyone at Longwood to carry out organizational goals. **QUALIFICATIONS:** Applicant should hold a Bachelor of Science degree in ornamental horticulture or related field and have a minimum of 5 years of supervisory experience in landscape horticulture. The person in this position must possess a strong interest in and aptitude for the selection and effective application of mechanical equipment in the workplace. This position requires an individual with a proven ability as a field leader. Good communications and human relations skills are crucial. A solid background in the identification and culture of temperate woody and herbaceous plant material is necessary. The applicant must understand the use of plants in garden design as opposed to collections, since Longwood is a display garden committed to excellence in Horticultural Display. Longwood does not maintain collections for collections sake. **SALARY:** \$28,368 - \$42,348 per year. **DEADLINE FOR APPLICATION:** March 1, 1988. **STARTING DATE:** June 1, 1988. Send letter of application, 3 or more references to: F. Joseph Carstens, Head, Department of Horticulture, Longwood Gardens, Inc., Box 501, Kennett Square, PA 19348-0501. 2/88

Lucrative, challenging opportunity for motivated individual to direct irrigation division of leading landscape/irrigation company. Thorough knowledge of design & trouble shooting a must. Send resume to TERRAFIRMA INC., Attn: David Bender, 3780 E. Morgan Road, Ypsilanti, MI 48197. 313-434-3811. 2/88

TREE CARE SALESPERSON - B.S. degree preferred in Urban Forestry, Horticulture or related field. We offer Medical Plan, Profit Sharing, Savings Plan and Paid Vacation. Send resume with pay history to Ira Wickes - Arborists, 11 McNamara Road, Spring Valley, NY 10977, 914-354-3400, attention John. 5/88

Ours Does.

The TM-Jr is our smallest and most economical Power Mulcher, yet it will blow hay or straw mulch (and even some bark mulches) a distance of 30 feet (100 feet with extension hose) at a rate of up to two bales per minute. The "Jr." can also be used as a vacuum for leaves.

For larger mulching jobs, consider models TM7-30 or M80C. For more information on our Power Mulchers, mulch diskers (crimpers) or our complete line of Hydrograssers, write or call toll free, 1-800-526-7687.

Reinco

P.O. Box 512
Plainfield, NJ 07061

Circle No. 149 on Reader Inquiry Card

HELP WANTED

Opportunity for Lawn Care Professional in fast growing quality minded company in Eastern Long Island. Excellent earning potential. Experience in sales, agronomy, and turf management a must. Write to LM Box 441. 2/88

ASSISTANT MANAGER/FOREMEN - Expanding maintenance/design firm servicing corporate accounts and estates, requires quality-conscious assistant manager for maintenance division and experienced foremen for maintenance and construction divisions. Associate horticulture degree plus 2 years experience desirable. Excellent compensation package, advancement and career opportunities for goal-oriented individuals. Submit letter of application, resume and salary history (in confidence) to: Eastern Land Management, 433 West Main Street, Stamford, CT 06902. 2/88

\$1,000,000.00 SALES PERSON - Our top producing landscape salesperson sold \$1.6 million during 1987. We're looking for a challenger, a motivated and overachieving landscape salesperson with a proven track record. If you are looking for top wages, an opportunity to excel, and your background includes sales of quality landscapes and developing client loyalty, call today and accept the challenge. Our 16 year young, award-winning Design/Build firm serves residential and commercial clients in the booming Cleveland, Ohio market area. Call 216-357-8400. 5/88

LANDSCAPE MAINTENANCE FOREMAN

We want someone who is the "Felix Unger" of lawn maintenance. In short, someone who is meticulous, neat and organized to head up our maintenance crews. We want professionals who take pride in their workmanship. Terrific benefit package and incentive program. Forward resume and salary history to:

Green Carpet Landscaping
161 Washington St.
Worcester, MA 01610
or call
617-791-3704

OPERATIONS MANAGER to organize and coordinate 8-9 construction crews daily for large commercial landscape contractor located north of Boston. Must have minimum 5-6 years landscape construction experience, be an aggressive, well-organized, people-oriented person with applicable educational background. Excellent salary and benefits. Send resume with salary requirements to: J. Farmer & Co., Inc., 219 R South Main Street, Middleton, MA 01949. 2/88

LANDSCAPE DESIGNER AND ESTIMATOR. Design/build landscape construction firm is seeking an experienced designer and estimator. Must be able to handle the job from sales to completion of job. Must have good graphic ability. Salary and benefits commensurate with ability and experience. Send resume to: P.O. Box 725, Utica, MI 48087. 2/88

PRODUCTION/SALES/MANAGEMENT — Aggressive Texas full-service landscape firm now accepting resumes for entry level positions in sales, production and management. Excellent opportunities for career, growth oriented persons. Send full resume to LM Box 443. 4/88

SAN FRANCISCO BAY AREA landscape management company has openings for Branch Manager, Supervisors, and Sales Positions in east and north bay areas. Must have demonstrated experience in client and employee relationships, be self-motivated and have strong horticultural background. Outstanding compensation and benefits to right individual. Send resume and salary history: Coast Landscape Management Co., 46 Rickenbacker Circle, Livermore, CA 94550. An EEO employer. 2/88

TRAINEES & FOREMEN: Washington D.C. area design-build firm is looking for career minded individuals who want to learn top of the line residential landscaping-construction, planting & landscape maintenance. We need professionals who are willing to work and can produce. We work a 4-5 day week and offer good pay with benefits. Send resume with references to: Garden Gate Landscaping, 821 Norwood Road, Silver Springs, MD 20904. Attn: Jim Seipel. 3/88

IRRIGATION. General managers, foremen, installers. We seek ambitious people interested in the lawn sprinkler industry. People who want to move up the ladder. Our training schedule allows you to advance quickly. We have opportunities in five midwest locations. Send us your resume and objectives. The Lawn Pros Sprinkler Co., 3508B Roger B. Chaffee Blvd., Grand Rapids, MI 49508. 2/88

LANDSCAPE FOREMAN. Must be experienced in all phases of landscape installation and construction, also able to delegate work, operate equipment that's associated with the landscape trade. Must be aggressive and self-motivated. Grow with us. Good salary and benefits. Send resume to Fred Azar Landscaping, Inc., 3873 Wyoga Lake Rd., Cuyahoga Falls, OH 44224. 216-923-7101. 2/88

LANDSCAPE SALESMAN NEEDED: Aggressive Landscape Company has immediate opening for career-minded, aggressive landscape and irrigation salesman. Permanent position with a future. Salary and benefits commensurate with experience. Equal opportunity employer. Send resume to Mickey Strauss, American Landscape, Inc., 7949 Deering Avenue, Canoga Park, CA (818)999-2041. 2/88

GROUNDS MANAGER - Well established, quality conscious, real estate development and management firm requires full time Grounds Operation Manager for all seasons management of large corporate office parks located primarily in the lower Connecticut/Westchester/Putnam, New York area. Applicant must have minimum five years experience in care and management of trees, shrubs, turf and pavement. Knowledge of and ability to administrate contracts. A working knowledge of site work and irrigation systems. Individual must have good communication skills and ability to deal with labor as well as executive staff. **Growth position.** Salary open. Send resume and salary requirements to: Grounds Management, Box 269, 324 Main Street, Norwalk, Connecticut 06851. 2/88

Commercial Landscape Contractor in Chicago suburbs seeks an individual for its estimating staff. Applicant must have excellent mathematical aptitude, ability to read and interpret landscape plans, and compatibility with computer and horticultural knowledge. Please send resume with cover letter to Otto Damgaard Sons, P.O. Box 182, Des Plaines, IL 60016. Attention Valarie Shepard. 3/88

LANDSCAPE MAINTENANCE SUPERVISOR - Rapidly expanding landscape management firm seeking experienced quality individuals with ability to manage people. Tremendous opportunity with full benefits. Forward your resume with salary history to Tandem Landscape Company, 33W480 Fabryan Parkway, Suite 101, West Chicago, IL 60185. Attention: Glenn Kedzie. 3/88

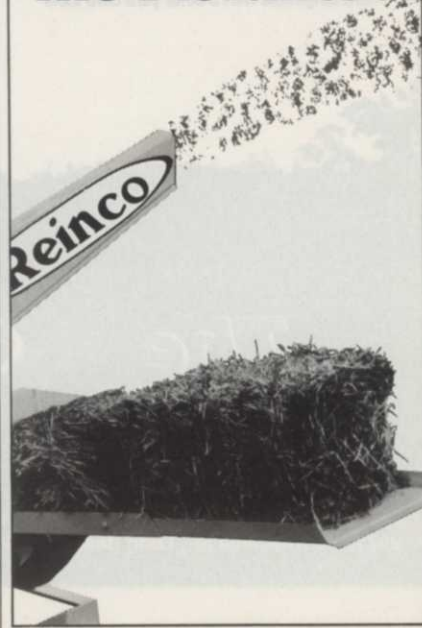
SALES MANAGER - A very aggressive person currently active as sales manager is needed to develop sales for an established and progressive (design/build landscape firm located in the Chicago western suburbs) firm. This person will work closely with a principal of the firm and eventually take over the top management position of vice president in charge of sales. Good salary. Compensation package tied to performance. Equity/ownership possible for the right person. We are interested in only experienced highly motivated professional individuals. Send resume to LM Box 447. TF

PROFESSIONALS: Foreman And Asst. Foreman

Grow with an exciting, innovative and expanding firm. We're ranked in the "top 50" in America. Come talk to us and build a rewarding career with New England's best. We are searching for experts in site layout, planting, sodding, tie work, brick/bluestone paving and irrigation. Strong customer relations a plus. We offer great benefits, vacation, incentive and division administrative potential for the management oriented. Forward your resume with salary history to:

Green Carpet Landscaping
161 Washington St.
Worcester, MA 01610
or call
617-791-3704

Does Your Power Mulcher Go the Distance?



Circle No. 150 on Reader Inquiry Card

HELP WANTED

Gazebo Dealers Wanted. Huge profits selling pre-assembled gazebo kits. Different sizes and styles available. High quality kits manufactured in Michigan. Shutt Construction Co., P.O. Box 397, Williamston, Michigan. Phone (517) 655-1915. 4/88

LANDSCAPE SUPERVISOR. Well-established landscape contractor has immediate opening available in the construction division. Must have either landscape or construction industry experience and have a class "C" license for truck driving. We offer motivated individuals an opportunity to grow with a company with a strong future and many benefits. Amlings Landscape Co., (312) 850-5096. 2/88

Landscape Salesperson position available with Yardmaster, Inc. in Cleveland, Ohio. Excellent compensation plan and benefits. Join Ohio's largest design/build and maintenance firm. Send resume or call **YARDMASTER, INC., 1447 N. RIDGE RD., PAINESVILLE, OH 44077, 216-357-8400.** 2/88

We are looking for a Landscape Supervisor with experience in leading and working with installation crews. Duties include job scheduling, estimating, reading blueprints, staking jobs, and pruning. We are located in the heart of the Blue Grass State of Kentucky. Family owned business since 1841. Benefits include paid vacation after 1 year, health insurance plus profit sharing. Your salary is negotiable depending on experience. Contact Stephen Hillenmeyer, C/O Hillenmeyer Nursery, 2370 Sandersville Road, Lexington, KY 40511. 2/88

"It cuts big jobs down to size!"

"We were impressed with other stringtrimmer/brushcutters until we tried THE GREEN MACHINE® Model 3000SS. Now we know the others just can't compare. We cut briars an inch in diameter with this stringtrimmer, then switch to the blade for anything up to three inches.

"It's one heck of a unit. We put 30-35 hours a week on it for four years and there's just as much compression as when it was new. It's tough!

"Now we're looking forward to the new technology of The Panther series so we can tackle even more jobs."

—Anna & David Cook, Green Thumb Gardening, Crescent City, Calif.

Introducing The Panther. Another great Expand-It® System from THE GREEN MACHINE®, designed especially for the professional landscaper.

Stringtrimmer/Brushcutter

- 24.1cc commercial engine with 1.3 horsepower
- All position state of the art carburetor
- Anti-vibration harness
- Patented Tap-For-Cord™ string release
- Brush and saw blade capabilities
- Interchangeable with 3 other yard care tools

The Green Machine®

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20710 So. Alameda St., Long Beach, CA 90810



CENTRAL PARK, N.Y.C. Immediate openings to work in various supervisory and/or field positions relating to capitalize tree care, capitalize turf care and capitalize landscape maintenance. We are looking for motivated, self-starters who are dependable and independent thinkers. Excellent opportunity for the right person. Be a part of the team caring for N.Y.C.'s Green Oasis! Horticultural education/professional experience required. Must possess a valid drivers license. Send resume with salary history to Neil Calvanese, Director of Horticulture, Central Park Conservancy, 830 5th Avenue, New York, NY 10021. 2/88

Help Wanted—Grounds management supervisor—AWARD WINNING CORPORATION is seeking grounds management supervisor. Must be "intelligent" and self-motivated with a minimum of 2 years "hands-on" supervisory experience. Must be able to schedule, train and motivate crews of 9 - 12 in all phases of grounds care. Horticultural degree and pesticide license beneficial. Send resume with salary requirements to A&R Landscaping, 500 Tidewater Drive, Norfolk, VA 23504. 2/88

WINNERS ONLY: If you love the lawn care business, and are still looking for your personal security and comfort levels, send us your resume. Your experience should be in all phases of lawn care, management, customer sales and service. We are expanding our operations and will offer the right individual a unique once in a lifetime opportunity. When you prove your abilities, we'll guarantee your success. Send your confidential resume to: P.O. Box 5677, Rockville, MD 20855. 2/88

LANDSCAPE MANAGEMENT MANAGER: Leading Kansas City landscape company has immediate opening for talented, experienced and aggressive person to manage and develop our maintenance and chemical division. Excellent growth opportunity. B.S. in horticulture or related field preferred. Salary incentive, benefits. Send resume with experience and salary history to: Hermes Company, P.O. Box 14336, Lenexa, KS 66215. 913-888-2413. 3/88

Southwest's finest landscape management company seeking enthusiastic, motivated individual for Landscape Maintenance Supervisor's position. Must have Supervisor's ability and minimum 2 years experience in maintenance and/or installation. Agricultural related background or degree helpful. Send resume/work history to: Personnel Director, Maintain, Inc., 2549 Southwell, Dallas, TX 75229. 2/88

LARGE MIDWESTERN DESIGN/BUILD LANDSCAPE CONTRACTING FIRM IS SEEKING:

CONSTRUCTION FOREMAN: No less than 3-5 years experience, must be well motivated and be able to motivate others, direct projects from beginning to end. Blue print reading and plant knowledge a must. Willingness to work hard and produce can lead to advancement.

FIELD OPERATIONS SUPERINTENDENT: Responsible for the coordination of 8-10 landscape construction crews. Must be well organized. Excellent supervisory skills. Have ability to communicate with clients and general contractors. Must be a self-starter, highly motivated and goal oriented individual.

Salary and benefits commensurate with ability and experience. Send resume to:

**P.O. Box 725
Utica, MI 48087**

HELP WANTED

PROTURF TECHNICAL REP

Scotts ProTurf Division currently has a ProTurf Tech Rep opportunity available within its national sales force.

Tech Reps are responsible for the sale, promotion, and servicing of Scotts commercial ProTurf products to those professionals responsible for the management of large turf areas such as golf courses and college campuses. Tech Reps specialize in product knowledge and agronomic expertise to recommend and sell the Scotts ProTurf product line. Territory sales responsibilities can range from 100 or more golf course accounts contained within a geographical territory.

The ideal candidate will have a college degree in turf management or agronomic science and turf related job experience.

Scotts offers an excellent starting salary plus incentive, company car, and a comprehensive benefit program including profit sharing. Interested candidates should send a resume with current salary level in confidence to: **Corporate Human Resources, O.M. Scott & Sons Company, 14111 Scottslawn Road, Marysville, Ohio 43041.**



An Equal Opportunity Employer M/F/H

MANAGEMENT: Ever-Green Lawns Corporation, a division of the multi-national Hawley Group, Ltd. is looking for experienced lawn and tree care professionals. Please respond in writing only to Richard D. Niemann, Corporate Recruiter, Ever-Green Lawns Corp., 1390 Charlestown Industrial Drive, St. Charles, MO 63303. TF

CAREER OPPORTUNITIES

ORKIN LAWN CARE (a division of Rollins, Inc.), is one of the nation's largest and fastest growing Lawn Care Companies. With over 43 branches located in 12 states our expansion plans for FY88 will require more proven management.

We are looking for Branch, District and Region Management talent, as well as, Sales and Service Management employees.

If you are ready to join an aggressive company with over 87 years of service business experience, one that is stable, growing and one where you can build a strong career with unlimited advancement opportunities then send your resume **TODAY** or call 404-888-2771.

Personnel Director
Orkin Lawn Care Division
P.O. Box 647
Atlanta, GA 30301

HELP WANTED: Landscape, turf and spray foremen, nurserymen and pruners. Experience and/or education necessary to work for our dynamic, quality oriented, large, 40 year established company in the Hamptons on Long Island. Professional wages and benefits, year round, full time positions. Contact: Whitmore-Worsley Inc., P.O. Box 10, Amagansett, NY 11930. (516) 267-3756.

3/88

LANDSCAPE CONSTRUCTION FOREMAN. Experienced persons needed to lead our construction crews. A thorough knowledge in sodding, planting, R/R tie work, and walk/patio construction are required. Come grow with this progressive landscape corporation. Send resume and salary history to: D.J. Murphy Landscape Co., Inc., P.O. Box 3079, Framingham, MA 01701. 2/88

IRRIGATION DESIGNER/SALESMAN FOR LANDSCAPE CONTRACTING FIRM IN WEST CENTRAL FLORIDA, THE FASTEST GROWING AREA IN THE NATION. Must be experienced in all aspects of irrigation design and installation for commercial and residential properties. **SEND RESUME TO: MANAGER, P.O. BOX 1471, BROOKSVILLE, FL 34605-1471.**

2/88

WANTED - Aggressive Manufacturer's Reps - Manufacturer of agricultural, golf course, municipal and lawn & garden spraying equipment is seeking qualified reps with experience in sprayer sales. Seeking nationwide network, exclusive territory contract, excellent technical support and top of the line equipment. Send resume and current line card to: The Broyhill Company P.O. Box 475-CB, Dakota City, NE 68731-0475. Phone: 1-800-228-1003.

3/88

"It puts the air force on your side!"

"A friend referred us to THE GREEN MACHINE® Expand-It® System blower. He said it was better because it works closer to the ground to give you more control. He was right. The blower is fantastic.

We really pushed that first unit hard — over 40 hours a week during the season. So we bought a bunch more. Recently, we referred a friend to the Expand-It® blower and he bought one to test. You guessed it: he just bought more of them! We're looking forward to the new Expand-It® System blower because it'll make a great thing greater."

—Gary Stovall & Vincent Morales, Partners
Landscape Concepts, Houston, Texas

Introducing The Panther. Another great Expand-It® System from THE GREEN MACHINE®, designed especially for the professional landscaper.

Power Blower

- High performance — 109 MPH/431 CFM (Cubic Ft. Per Minute)
- Lightweight, excellent balance. No strapping to operator's back.
- Easy control and removal of debris and leaves
- Interchangeable with 3 other yard care tools



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Circle No. 122 on Reader Inquiry Card

CENTRAL PARK, N.Y.C. Curator Conservatory Garden: Executive position for experienced horticulturist in large formal public garden of 6 acres. **RESPONSIBILITIES:** Maintaining and directing functioning of restored garden, supervising staff and volunteers; working with community groups and general visitors. **QUALIFICATION:** Knowledge of estate gardening with emphasis on perennial and experience working with public. Degree in horticulture preferred. **SALARY:** \$28,000. Good benefits package. To apply, write LM Box 444. 2/88

SALES REPRESENTATIVE: Outstanding opportunity to join and grow with Westchester's fastest growing Tree Care Company. All benefits. Send resume to Ms. Michele Gerards, Sav-A-Tree of Westchester, Inc., P.O. Box 527, Armonk, NY 10504-0527. 2/88

TREE CLIMBERS/BUCKET OPERATORS/STUMP GRINDER OPERATORS Large landscape company needs reliable employees. Excellent wages and benefits for career-minded individuals with two years experience supervising and motivating people. Send resume to Rood Landscape Co., P.O. Drawer 1568, Jupiter, FL 33468-1568 or Phone (305) 746-5186. 2/88

PERSONNEL: Hydro Lawn, a Mid-Atlantic full service lawn care company is accepting applications for Sales/Customer Service management positions. Applicants must be aggressive, responsible, neat and experienced in sales/customer service. Compensation from \$25-35,000 plus full benefit package. Send resume to: Hydro Lawn, Inc., 7905 Airpark Road, Gaithersburg, Maryland 20879. TF

IPM Technician - Excellent opportunity for knowledgeable, experienced professional. Must be familiar with trees, shrubs, insects, and diseases of the Northeast U.S. Ability to diagnose problems and treat with appropriate chemicals on site required. Additional training will be provided. Join fast growing company with excellent pay and benefits. Send resume to Don Becker, Director of Operations, Sav-A-Tree of Westchester, Inc., P.O. Box 527, Armonk, NY 10504-0527. (914) 666-8202. Position available February 1988. 2/88

Working managers experienced in all phases of lawn servicing looking for opportunity to grow. We offer lots of work, advancement opportunities to the right people, good to excellent compensation and security. Must be willing to relocate to the East coast (Washington D.C. area) or if you're the right person we will consider you for a new office from Virginia Beach to Northern New Jersey. Call or write to: Ron Miller, Super Lawns, P.O. Box 34278 Bethesda, MD 20817, 301-365-4740. 2/88

Landscape Designer / Salesperson - A good deal for the right person. Send resume or call J. Gilmore Design Landscaper, P.O. Box 400, Cortland, OH 44410 (216) 638-2075. 3/88

FOR SALE

FOR SALE: Brouwer Roll-Up Sod Harvester, model A3A 18" on Ford 3000 Diesel tractor. 513-667-1346. 3/88

Ryan Sod Cutter with cut-off. Excellent condition. \$2,000. 501-729-5847. TF

Brouwer Harvester - Ser. #178 - 16" Roll Roof & Lites MF 135 D - \$9900. Robark Net Setter — **BEST OFFER.** 1972 IH 1800 Tandem Flatbed 392 Gas Engine - \$4500. Call M-F. Thornton's Sod Nursery (312) 742-5030. 2/88

Hustler 275, Bobcat T186 lawn mowers for sale, also Scaggs 48" Rider along with assorted walk behind mower. All in good condition. 516-267-7789. 3/88

TS40 TREESPADE, Vermeer Stump Cutter both on 1-ton chassis. Spade 80, Stump Cutter 78 - both excellent - good condition. Kim Landscaping, R.D. #6, Box 2358, Mt. Pleasant, PA 15666. (412)547-3200. 2/88

SPYDERS—New/Used/Rebuilt. New Kohler engines, short blocks and a complete line of engines and Spyder replacement parts. New Style Nichols-Fairfield Torque Hub Kits, heavy duty Wilton-Caster Hub Kits, Remote Air Cleaner Kits, heavy duty Carriage Side Plates. Call or Write: Mobile Lift Parts, Inc., 5402 Edgewood Rd., Crystal Lake, IL 60012. 815-455-7363. 3/88

SPRAY TRUCK: 1985 International. With 1000/250 gal. tanks, Meyers pump, 2 Hannay reels, each with 400 ft. hose, very well maintained, professionally serviced, excellent condition. Has bedrails, spreader brackets, hand-sprayer holders, new paint. Call 203-372-3511, Tony or Bob. 2/88

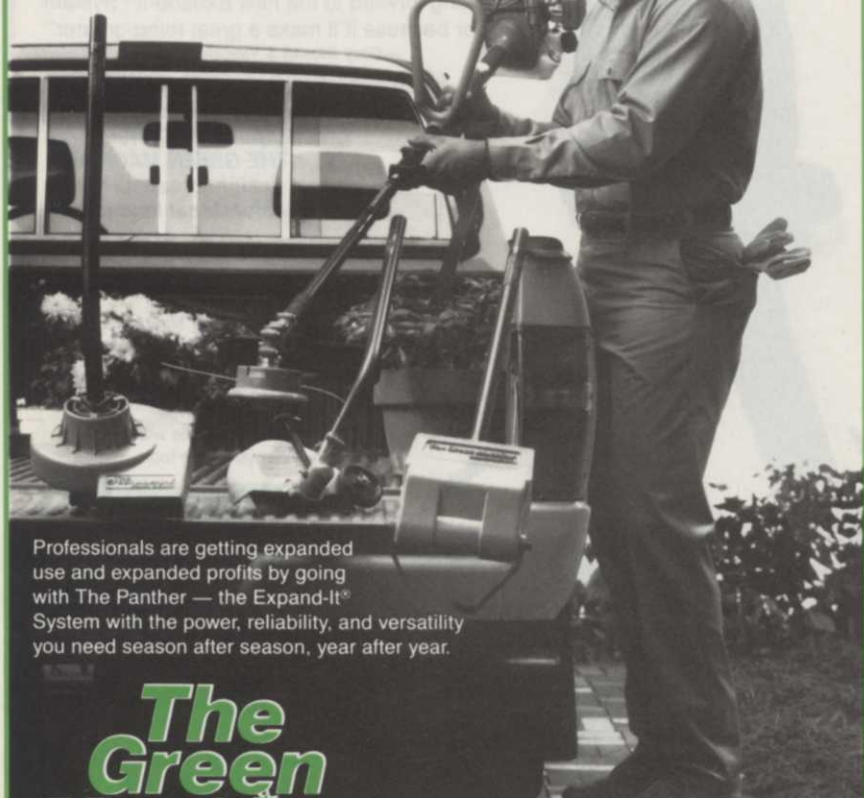
Two used Brouwer Harvesters, Fords, 18" rolling units—both reconditioned and ready to go. \$19,000 and \$18,000. Model 3500 Hitchhiker, \$14,000, Model 3600 Hitchhiker, new and demos. Like new Spyder diesel, \$15,000. Baker York—perfect shape, \$8,000. Huber Ranch Sod Nursery, 219-552-0552. 2/88

ROCK RAKES—Harley TR3-8 3 Pt. Hitch, PTO Drive, Good Condition. **ROCK PICKER**—Anderson E Series, PTO Drive with Hi-Lift, Excellent Condition. Write or call: Bob Ruff, Stoney Creek Golf Course, Wintergreen, Virginia 22958. (804) 325-2200 Extension 530. 3/88

Expanding your business is our business!

Introducing The Panther, another great Expand It® System from THE GREEN MACHINE® that landscapers have come to trust for performance, durability, and serviceability.

Now, you have the four most needed tools in one efficient system. Here are your Stringtrimmer/Brushcutter, Edger, Weeder/Cultivator, and Blower—all available to you with a single twist of a single knob on the easy-to-hold, well balanced, and lightweight shaft. Plus, this patented coupling system permits you to disassemble your equipment and securely lock it in the cab of your truck.



Professionals are getting expanded use and expanded profits by going with The Panther — the Expand-It® System with the power, reliability, and versatility you need season after season, year after year.

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20710 So. Alameda St., Long Beach, CA 90810



Circle No. 123 on Reader Inquiry Card

FOR SALE

Bucket Trucks, Tree Spade, Chippers, Stump Grinders, all makes and sizes. Check with us for the best deal going! Equipment in your area. We're Brokers. American Equipment Sales 314-789-3576. 24 Hours. TF

TREE SPRAYER - 1984 FMC 500 gallon sprayer with new fiberglass tank. Mechanical agitation, 20 gallon/minute pump, 600 psi. Mounted on 1975 Ford F600, Imron paint, excellent condition. Asking \$8,500.00 as unit. Will sell separately. Call (616)896-9588. 2/88

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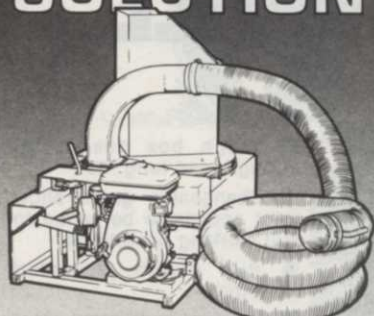
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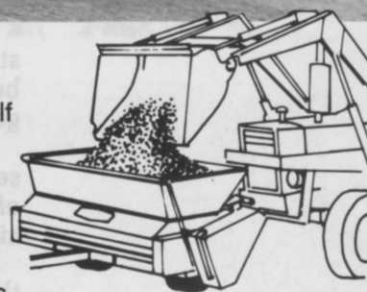
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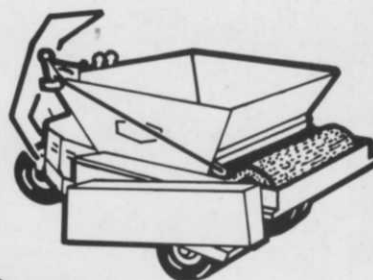
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Reincarnating the spirit of grass

They were the 21 pages that shook the world—the athletic turf world, anyway. "The Tyranny of Phony Fields," *Sports Illustrated*, August 12, 1985, was one of the first in-depth views of artificial vs. natural athletic fields presented to the general public. Those pages echoed the pain of paralyzed players; talked technically about the turf; and even satirized the issue amidst the hard facts.

One cartoon which sticks in my mind shows a baseball player crying at a headstone. The marker reads, "HERE LIES/GRASS/DIED/MARCH 19, 1966." On that date, Houston installed the first AstroTurf field in its dome stadium.

But with the new year comes a new vision for such a cartoon: a spirit rising from the grave with the caption reading, "GRASS/REINCARNATED/1988." This has nothing to do with the new age-Shirley MacLaine openness to reincarnation. Instead, it signals a new age in athletic turf.

During the last month, I received two phone calls: one from a sports reporter in Boulder, Colo.; the other from a Patriots fan in Foxboro, Mass. Both wanted reprints of *LANDSCAPE MANAGEMENT*'s articles "Sidelined" and "Hard Knocks" on athletic field safety. Both are waging campaigns against artificial turf. Kelly Lyle, the sports writer, wants the University of Colorado to replace its synthetic turf with grass. Debbie DeSantis, the fan, wants Sullivan Stadium to go with natural turf. Lyle's print campaign has, in fact, stalled the decision of the university, until the economics of going with grass can be reviewed. DeSantis, who is concerned for the safety of the players, is just getting her campaign off the ground.

Athletic turf managers on all levels need to take fans, parents and media more seriously. After all, it was a fan, Rose Marie Branson, who, along with the support of the *Toronto Star*, got Toronto to at least consider putting natural turf in the city's new dome. (The stadium commission decided against it.)

This is not just an arbitrary issue which gives fans and sports writers something to talk about. It's one that's important to the athletes as well. Soldier Field in Chicago will return to grass this year, at the request of the Bears. "The injuries to (former Bears cornerback) Les Frazier and (wide receiver) Dennis McKinnon were directly related to (artificial) turf," Robert Mier, the late Mayor Harold Washington's stadium advisor, told the *Chicago Sun-Times*.

Finally, key people are recognizing the advantages of natural turf. 1988 is not just a new year, but the beginning of a new age: the reincarnation of the spirit of grass.

Heide Aungst
Heide Aungst, managing editor

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